

Host Controller Interface (HCI)

Bluetooth® Test Suite

- **Revision:** HCI.TS.5.1.1
- **Revision Date:** 2019-08-01
- **Group Prepared By:** BTI
- **Feedback Email:** bti-main@bluetooth.org



This document, regardless of its title or content, is not a Bluetooth Specification subject to the licenses granted by the Bluetooth SIG Inc. ("Bluetooth SIG") and its members under the Bluetooth Patent/Copyright License Agreement and Bluetooth Trademark License Agreement.

THIS DOCUMENT IS PROVIDED "AS IS" AND BLUETOOTH SIG, ITS MEMBERS, AND THEIR AFFILIATES MAKE NO REPRESENTATIONS OR WARRANTIES AND DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY, TITLE, NON-INFRINGEMENT, FITNESS FOR ANY PARTICULAR PURPOSE, THAT THE CONTENT OF THIS DOCUMENT IS FREE OF ERRORS.

TO THE EXTENT NOT PROHIBITED BY LAW, BLUETOOTH SIG, ITS MEMBERS, AND THEIR AFFILIATES DISCLAIM ALL LIABILITY ARISING OUT OF OR RELATING TO USE OF THIS DOCUMENT AND ANY INFORMATION CONTAINED IN THIS DOCUMENT, INCLUDING LOST REVENUE, PROFITS, DATA OR PROGRAMS, OR BUSINESS INTERRUPTION, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY, AND EVEN IF BLUETOOTH SIG, ITS MEMBERS, OR THEIR AFFILIATES HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

This document is proprietary to Bluetooth SIG. This document may contain or cover subject matter that is intellectual property of Bluetooth SIG and its members. The furnishing of this document does not grant any license to any intellectual property of Bluetooth SIG or its members.

This document is subject to change without notice.

Copyright © 2005–2019 by Bluetooth SIG, Inc. The Bluetooth word mark and logos are owned by Bluetooth SIG, Inc. Other third-party brands and names are the property of their respective owners.



Contents

1	Scope	7
2	References, Definitions, and Abbreviations	8
2.1	References	8
2.2	Definitions	8
2.3	Abbreviations	8
3	Test Suite Structure (TSS)	9
3.1	Test Strategy	9
3.2	Test Groups	10
3.2.1	Main Test Groups	10
3.2.1.1	Generic Events	10
3.2.1.2	Device Setup	10
3.2.1.3	Controller Flow Control	10
3.2.1.4	Controller Information	10
3.2.1.5	Device Discovery	11
3.2.1.6	Host Flow Control	11
3.2.1.7	Authentication and Encryption	11
3.2.1.8	Controller Configuration	11
3.2.1.9	Controller Setup	11
3.2.1.10	Connectionless Slave Broadcast	11
3.2.2	Behavior Test Groups	11
3.2.2.1	Valid Behavior (BV) Tests	11
3.2.2.2	Invalid Behavior (BI) Tests	11
4	Test Cases	12
4.1	Introduction	12
4.1.1	Test Case Identification Conventions	12
4.1.2	Conformance	12
4.1.3	Baseband Assumptions	13
4.1.4	Master – Slave Switch	13
4.1.5	Default Settings	13
4.1.6	Applicable Parameter Values	13
4.1.7	Pass/Fail Verdict Conventions	14
4.1.8	Notation Conventions	14
4.2	Generic Events	14
4.2.1	HCI/GEV/BV-01-C [Unsupported Commands on each supported controller]	14
4.2.1	HCI/GEV/BV-02-C [Disallow Mixing Legacy and Extended Advertising Commands]	15
4.2.2	HCI/GEV/BV-03-C [Disallow Mixing Legacy and Extended Scanning Commands]	18
4.2.3	HCI/GEV/BV-04-C [Extended Advertising Commands Without Scan Response Data]	20
4.3	Device Setup	20
4.3.1	HCI/DSU/BV-01-C [BR/EDR Controller Reset Command]	20
4.3.2	HCI/DSU/BV-02-C [Reset in Advertising State]	22
4.3.3	HCI/DSU/BV-03-C [Reset to Slave]	23
4.3.4	HCI/DSU/BV-04-C [Reset in Scanning State]	24
4.3.5	HCI/DSU/BV-05-C [Reset in Initiating State]	26
4.3.6	HCI/DSU/BV-06-C [Reset to Master]	28
4.3.7	HCI/DSU/BV-07-C [AMP Controller Reset Command]	29
4.4	Controller Flow Control	31



4.4.1	HCI/CFC/BV-01-C [Read Buffer Size Command]	31
4.4.2	HCI/CFC/BV-02-C [Buffer Size]	33
4.5	Controller Information	34
4.5.1	HCI/CIN/BV-01-C [Read Local Supported Features Command]	34
4.5.2	HCI/CIN/BV-02-C [Read Local Extended Features Command]	34
4.5.3	HCI/CIN/BV-03-C [Read Local Supported Commands Command]	35
4.5.4	HCI/CIN/BV-04-C [Read Local Version Information Command]	36
4.5.5	HCI/CIN/BV-06-C [White List Size]	37
4.5.6	HCI/CIN/BV-07-C [REMOVED TEST]	39
4.5.7	HCI/CIN/BV-08-C [Read Local Simple Pairing Options Command]	39
4.5.8	HCI/CIN/BV-09-C [Read LE Public Key Validation Feature Bit]	40
4.6	Device Discovery	40
4.6.1	HCI/DDI/BV-01-C [Periodic Inquiry Mode Command]	40
4.6.2	HCI/DDI/BV-02-C [Write Inquiry Mode Command]	42
4.6.3	HCI/DDI/BV-03-C [Set Advertising Enable]	43
4.6.4	HCI/DDI/BV-04-C [Set Scan Enable]	44
4.6.5	HCI/DDI/BV-05-C [Read Extended Inquiry Length]	45
4.6.6	HCI/DDI/BI-01-C [Reject Invalid Extended Advertising Parameters]	46
4.6.7	HCI/DDI/BI-02-C [Reject Invalid Advertising Parameters]	47
4.6.8	HCI/DDI/BI-03-C [Reject LE Periodic Advertising Create Sync Command With Disallowed Reporting Options] 48	
4.6.9	HCI/DDI/BI-04-C [Reject LE Periodic Advertising Create Sync Command to a Synchronized Advertising Set]	49
4.6.10	HCI/DDI/BI-05-C [LE Set Extended Scan Parameters With Unsupported PHY]	51
4.6.11	Reject Invalid Enable Command	52
4.6.12	HCI/DDI/BI-12-C [Reject Invalid Extended Advertising Enable Command]	54
4.6.13	HCI/DDI/BI-13-C [Reject Invalid Periodic Advertising Enable Command]	55
4.7	Host Flow Control	55
4.7.1	HCI/HFC/BV-01-C [Set_Event_Mask Command]	55
4.7.2	HCI/HFC/BV-02-C [Set_Event_Filter Command]	56
4.7.3	HCI/HFC/BV-03-C [Set_Event_Mask_2 Command]	57
4.7.4	HCI/HFC/BV-04-C [LE Set Event Mask]	59
4.7.5	HCI/HFC/BV-05-C [Set_Event_Filter Command to perform auto accept connection from configured and specified bd address over ACL]	61
4.7.6	HCI/HFC/BV-06-C [Set_Event_Filter Command, connection request rejection]	62
4.7.7	HCI/HFC/BV-07-C [Set_Event_Filter Command, Host configures the Controller to Allow Connections, specifying a Class of Device and a Class of Device Mask]	63
4.7.8	HCI/HFC/BV-08-C [Set_Event_Filter Command to controls which events are generated using filters] 64	
4.7.9	[Set_Event_Filter Command to perform auto accept synchronous connection from configured and specified bd address]	67
4.7.10	HCI/HFC/BV-11-C [Auto Accept Off, Event Masked, connection request rejection over ACL]	68
4.7.11	[Auto Accept Off, Event Masked, connection request rejection over SCO Type]	69
4.8	Authentication and Encryption	71
4.8.1	HCI/AEN/BV-01-C [Link Key Commands]	71
4.8.2	HCI/AEN/BV-02-C [Reading All Link Keys]	73
4.8.3	HCI/AEN/BV-03-C [Reading Single Link Key]	74
4.8.4	HCI/AEN/BV-04-C [Link Key Commands – IUT Returns All Zero Link Key]	75
4.8.5	HCI/AEN/BV-05-C [Read Local OOB Extended Data Command, test unique values]	76
4.8.6	HCI/AEN/BV-06-C [Public Keys]	77
4.8.7	HCI/AEN/BV-07-C [Generate DH Keys]	78
4.8.8	HCI/AEN/BV-08-C [Generate Debug Keys]	79

4.8.9	HCI/AEN/BI-01-C [Generate DH Key Error With Invalid Point]	80
4.9	Controller Configuration	82
4.9.1	HCI/CCO/BV-01-C [Write Location Data Command/ Read Location Data Command]	82
4.9.2	HCI/CCO/BV-02-C [Read LE Host Support Command]	83
4.9.3	HCI/CCO/BV-03-C [Write LE Host Support Command]	84
4.9.4	HCI/CCO/BV-05-C [LE Not Supported]	85
4.9.5	HCI/CCO/BV-07-C [BR/EDR Not Supported]	86
4.9.6	HCI/CCO/BV-08-C [Read Extended Page Timeout]	87
4.9.7	HCI/CCO/BV-09-C [LE Set Data Length]	88
4.9.8	HCI/CCO/BV-10-C [LE Read Suggested Default Data Length Command]	89
4.9.9	HCI/CCO/BV-11-C [LE Write Suggested Default Data Length Command]	90
4.9.10	HCI/CCO/BV-12-C [LE Remove Device From Resolving List Command]	91
4.9.11	HCI/CCO/BV-13-C [LE Clear Resolving List Command]	92
4.9.12	HCI/CCO/BV-14-C [LE Read Resolving List Size Command]	93
4.9.13	HCI/CCO/BV-15-C [LE Set Default PHY Command]	94
4.9.14	HCI/CCO/BV-16-C [LE Read Periodic Advertiser List Size Command]	95
4.9.15	HCI/CCO/BV-17-C [LE Add/Remove/Clear Periodic Advertiser List Commands]	96
4.9.16	HCI/CCO/BV-18-C [LE Read Transmit Power Command]	98
4.9.17	HCI/CCO/BV-19-C [LE Write RF Path Compensation Command]	99
4.9.18	HCI/CCO/BV-20-C [LE Read RF Path Compensation Command]	100
4.9.19	[Resolving List Commands fail when list in use]	101
4.10	Controller Setup	103
4.10.1	HCI/CSE/BV-01-C [Logical Link Cancel Command]	103
4.10.2	HCI/CSE/BV-02-C [Logical Link Cancel Command]	104
4.10.3	HCI/CSE/BI-03-C [Logical Link Cancel Command]	105
4.10.4	HCI/CSE/BI-04-C [Logical Link Cancel Command]	106
4.10.5	HCI/CSE/BV-05-C [Write Logical Link Accept Timeout Command/Read Logical Link Accept Timeout Command]	107
4.10.6	HCI/CSE/BV-06-C [Verify Truncated Paging]	108
4.10.7	HCI/CSE/BV-07-C [Page Response Timeout Detection]	109
4.11	Connectionless Slave Broadcast	110
4.11.1	HCI/CSB/BV-01-C [Connectionless Slave Broadcast Transmission]	111
4.11.2	HCI/CSB/BV-02-C [Delete Reserved LT ADDR]	113
4.11.3	HCI/CSB/BV-03-C [CSB Channel Map Change Event]	114
4.11.4	HCI/CSB/BV-04-C [Connectionless Slave Broadcast Reception]	117
4.11.5	HCI/CSB/BV-05-C [Connectionless Slave Broadcast Reception Timeout]	120
4.12	LE Connection Management	122
4.12.1	HCI/CM/BV-01-C [LE Read Peer Resolvable Address Command – Master]	122
4.12.2	HCI/CM/BV-02-C [LE Read Local Resolvable Address Command – Master]	124
4.12.3	HCI/CM/BV-03-C [LE Read PHY Command]	126
4.12.4	HCI/CM/BV-04-C [Extended Scanning with Device Privacy, RPA Timeout During Connection Initiation]	127
4.12.5	HCI/CM/BV-05-C [LE Read Peer Resolvable Address Command – Slave]	129
4.12.6	HCI/CM/BV-06-C [LE Read Local Resolvable Address Command – Slave]	131
4.12.7	HCI/CM/BI-01-C [LE Extended Create Connection With Unsupported PHY]	133
5	Test Case Mapping	135
5.1	Test Case Mapping	135
6	Appendix MSC	141
6.1	Default Settings	141



6.1.1	Authentication and Encryption	141
6.1.2	Device setup, Controller Flow Control, Controller Information, Device Discovery and Host Flow Control 142	
6.2	Preambles.....	143
6.2.1	Connection Establishment IUT Master.....	143
6.2.2	Connection Establishment Lower Tester	144
7	Revision History and Contributors	145

1 Scope

This Bluetooth document contains the Test Suite Structure (TSS) and Test Cases (TC) to test the Bluetooth HCI layer.

The objective of this test suite is to provide a basis for interoperability for Bluetooth devices giving a high probability of air interface inter-operability between different manufacturers' Bluetooth devices.

2 References, Definitions, and Abbreviations

2.1 References

This Bluetooth document incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter.

- [1] Specification of the Bluetooth System, Volume 2, Part E, Version 1.2 or later
- [2] Implementation Conformance Statement (ICS) for Host Controller Interface (HCI)
- [3] Bluetooth Test Strategy and Terminology Overview
- [4] Bluetooth Test Suite for Baseband, v1.2 or later
- [5] Bluetooth Test Suite for Link Manager v1.2 or later
- [6] Bluetooth Test Suite for 802.11 PAL v3.0 + HS or later
- [7] Bluetooth Test Suite for Link Layer Version 4.0 or later
- [8] Specification of the Bluetooth System , Core Package, Volume 2, Part E, Host Controller Interface (HCI), Version 4.2 or later
- [9] Specification of the Bluetooth System, Core Package, Volume 2, Part E, Host Controller Interface (HCI) Version 5.0 or later
- [10] Summary of Selected Specifications in Implementation (SUM ICS)
- [11] Erratum 10734: Pairing Updates
- [12] Specification of the Bluetooth System, Core Package, Volume 2, Part E, Host Controller Interface (HCI) Version 5.1 or later

2.2 Definitions

For the purpose of this Bluetooth document, the definitions given in [1] and [3] apply.

2.3 Abbreviations

For the purpose of this Bluetooth document, the abbreviations given in [1] and [3] apply.

3 Test Suite Structure (TSS)

3.1 Test Strategy

HCI is the interface between the upper and lower layers of the Bluetooth protocol stack.

The objective of HCI testing is to ensure interoperability and functionality between a Bluetooth host and a Bluetooth controller in order to enable qualification and combination of controller and host Designs. The test cases cover mandatory and optional requirements in the protocol specification, matching these to the supported IUT features described in the Implementation Conformance Statement [2].

Conformance testing is the appropriate test method to meet this intent. The conformance test equipment shall provide a Lower and Upper Tester implementation.

HCI is being exercised extensively as the test controller (i.e., the Upper Tester) during the Link Layer and Link Manager conformance tests, many HCI commands and events are therefore implicitly proven already within these conformance tests.

HCI specifies the following groups of commands:

- Device Setup
- Controller Flow Control
- Controller Information
- Device Discovery
- Host Flow Control
- Authentication and Encryption
- Controller Configuration
- Controller Setup
- Connectionless Slave Broadcast
- LE Connection Management

Figure 3.1 shows the HCI Test Suite Structure (TSS) including its subgroups defined for the conformance testing.

Generic Events
 Generic Events - Both Master and Slave
 Device Setup
 Device Setup - Both Master and Slave
 Controller Flow Control
 Controller Flow Control - Both Master and Slave
 Controller Information
 Controller Information - Both Master and Slave
 Controller Configuration
 Controller Configuration - Both Master and Slave
 Device Discovery
 Device Discovery - Both Master and Slave
 Connection Setup
 Connection Setup - Both Master and Slave
 Host Flow Control
 Host Flow control - Both Master and Slave
 Authentication and Encryption
 Authentication and encryption- Both Master and Slave
 Connectionless Slave Broadcast
 Connectionless Slave Broadcast – Both Master and Slave
 Synchronization Train – Both Master and Slave

Figure 3.1: TSS for HCI

3.2 Test Groups

The test groups are organized in three levels. The first level defines the protocol groups representing the protocol services. The second level separates the protocol services in functional modules. The last level in each branch contains the standard ISO subgroups BV and BI.

3.2.1 Main Test Groups

The following test groups have been defined.

3.2.1.1 Generic Events

This generic events group covers the IUT response to commands not supported by the IUT or disallowed after receiving the first legacy or extended advertising command.

3.2.1.2 Device Setup

The device setup group of commands is used to place the Controller into a known state.

3.2.1.3 Controller Flow Control

The controller flow control group of commands and events are used to control data flow from the Host to the Controller.

3.2.1.4 Controller Information

The controller information group of commands allows the Host to discover local information about the device.

3.2.1.5 Device Discovery

The device discovery group of commands and events allow a device to discover other devices in the surrounding area. On LE this group of commands is also used to control advertising and scanning functionalities on the LL.

3.2.1.6 Host Flow Control

The Host flow control group of commands and events allows flow control to be used towards the Host.

3.2.1.7 Authentication and Encryption

The authentication and encryption group of commands and events allows authentication of a remote device and then encryption of the link to one or more remote devices.

3.2.1.8 Controller Configuration

The controller configuration group of commands and events allows the global configuration parameters to be configured.

3.2.1.9 Controller Setup

The controller setup group of commands and events are used to allow a device to make a connection to another device.

3.2.1.10 Connectionless Slave Broadcast

The Connectionless Slave Broadcast group of commands and events allows use of the CSB logical link to broadcast data to an unlimited number of recipients.

3.2.2 Behavior Test Groups

3.2.2.1 Valid Behavior (BV) Tests

This sub group provides testing to verify that the IUT reacts in conformity with the Bluetooth standard, after receipt or exchange of valid HCI messages. Valid PDUs means that the exchange of messages and the content of the exchanged messages are considered as valid.

3.2.2.2 Invalid Behavior (BI) Tests

This sub group provides testing to verify that the IUT reacts in conformity with the Bluetooth standard, after receipt of a syntactically or semantically invalid HCI message.

4 Test Cases

4.1 Introduction

4.1.1 Test Case Identification Conventions

Test cases shall be assigned unique identifiers per the conventions in [3]. The convention used here is **<spec abbreviation>/<IUT role>/<class>/<feat>/<func>/<subfunc>/<cap>/<xx>-<nn>-<y>**.

Bolded ID parts shall appear in the order prescribed. Non-bolded ID parts (if applicable) shall appear between the bolded parts. The order of the non-bolded parts may vary from test suite to test suite, but shall be consistent within each individual test suite.

Identifier Abbreviation	Spec Identifier <spec abbreviation>
HCI	Generic Events
Identifier Abbreviation	Feature Identifier <feat>
AEN	Authentication and Encryption
CCO	Controller Configuration
CFC	Controller Flow Control
CIN	Controller Information
CM	LE Connection Management
CSB	Connectionless Slave Broadcast
CSE	Controller Setup
DDI	Device Discovery
DSU	Device Setup
GEV	Generic Events
HFC	Host Flow Control

Table 4.1: HCI TC Feature Naming Conventions

4.1.2 Conformance

When conformance is claimed, all capabilities indicated as mandatory for this Specification shall be supported in the specified manner (process-mandatory). This also applies for all optional and conditional capabilities for which support is indicated. All mandatory capabilities, and optional and conditional capabilities for which support is indicated, are subject to verification as part of the Bluetooth Qualification program.

The Bluetooth Qualification Program may employ tests to verify implementation robustness. The level of implementation robustness that is verified varies from one Specification to another and may be revised for cause based on interoperability issues found in the market.

Such tests may verify:

- That claimed capabilities may be used in any order and any number of repetitions that is not excluded by the Specification, OR
- That capabilities enabled by the implementations are sustained over durations expected by the use case, OR
- That the implementation gracefully handles any quantity of data expected by the use case, OR
- That in cases where more than one valid interpretation of the Specification exist, the implementation complies with at least one interpretation and gracefully handles other interpretations OR
- That the implementation is immune to attempted security exploits.

A single execution of each of the required tests is required in order to constitute a Pass Verdict. However, it is noted that in order to provide a foundation for interoperability, it is necessary that a qualified implementation consistently and repeatedly pass any of the applicable tests.

In any case, where a member finds an issue with the Test Plan Generator, the Test Case as described in the Test Suite, or with the Test System utilized, the Member is required to notify the responsible party via an errata request such that the issue may be addressed.

4.1.3 Baseband Assumptions

All test cases, except Connectionless Slave Broadcast, Synchronization Train, and Truncated Paging, are built upon having a Base Band Link up and running.

- The IUT and the Lower Tester must be in connection state (Active mode).
- DM1 packages must be used. ([6.2 Preambles](#))
- All test cases are built upon a connection between two (2) devices, a Master and a Slave.

Connectionless Slave Broadcast and Synchronization Train cases are built upon having a Connectionless Slave Broadcast enabled.

Truncated Page testing assumes both devices are in Standby.

4.1.4 Master – Slave Switch

To force the IUT to become Master of the Piconet, Paging of the Lower Tester must be used as PDU LMP_switch_req is optional and all IUTs will not support this. ([6 Appendix MSC](#) and [6.2 Preambles](#))

4.1.5 Default Settings

The default settings must be carried out before each test case to guarantee a correct set up each time the tests are performed. Please see Section [6.2 Preambles](#) for the set up messages used.

4.1.6 Applicable Parameter Values

The parameter values indicated in the test cases are thought to be reasonable. However, what is reasonable ultimately depends on the user scenario the IUT is intended for. In those cases where the



Bluetooth System Specification does not require the implementation of a specific value, and the IUT cannot support the value indicated in a test case, it is allowed to test the IUT with another value. The selected value has to be given as IXIT information. When a value deviates from what is indicated in the test case it shall be selected as close as possible to the value indicated in the test case. The selected value must not be such that the test purpose for the test case cannot be verified or the test case is not applicable. All test cases applicable as determined by the combination of Test Case Reference List, Implementation Conformance Statement and Test Case Mapping Table, must be executed successfully to complete the qualification of the IUT.

4.1.7 Pass/Fail Verdict Conventions

Each test case has an Expected Outcome section, which outlines all the detailed pass criteria conditions that shall be met by the IUT to merit a Pass Verdict.

The convention in this test suite is that, unless there is a specific set of fail conditions outlined in the test case, then the IUT fails the test case as soon one of the pass criteria conditions cannot be met and in case this occurs the outcome of the test shall be the Fail Verdict.

4.1.8 Notation Conventions

The conventions in documenting events have varied over time, between different specification versions as well as their respective test suites. Due to this legacy, instances of "_event", "_Event", and "Event" may occur in this test suite; all those should be understood to equate to "event" as the settled convention applied in Bluetooth 5.1 and later specifications. It is intended to harmonize usage in this test suite over time.

4.2 Generic Events

Test group objectives:

To verify the correct implementation of the Generic Events

4.2.1 HCI/GEV/BV-01-C [Unsupported Commands on each supported controller]

- Test Purpose

Verify that for each controller supported in the IUT, every HCI command not supported yields a Command Complete event with status 'Unknown HCI Command' in return.

- Reference

[1] 7.7.14

- Initial Condition

The IUT is not connected to the Lower Tester.

- Test Procedure

Repeat for each supported controller (1: BR/EDR Controller, 2: LE Controller, 3: AMP Controller) which has an unsupported HCI command.

Upper Tester sends HCI commands not supported by the IUT and expects the IUT to return HCI Command Complete Event or HCI Command Status Event with Status = Unknown HCI Command.



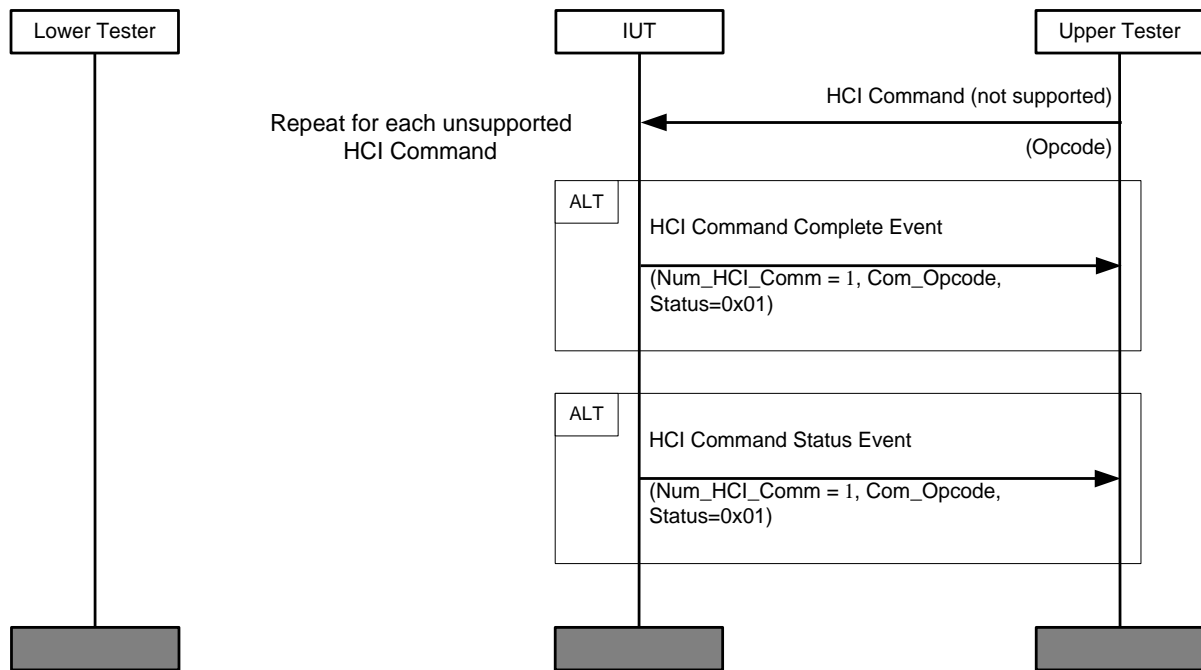


Figure 4.1: HCI/GEV/BV-01-C Unsupported Commands

- Expected Outcome

Pass Verdict

The IUT returns either an HCI Command Complete Event with Status = Unknown_HCI_Command or an HCI Command Status Event with Status = Unknown_HCI_Command.

- Notes

The test shall be run for all HCI commands indicated as not supported in the ICS. If all commands are supported on all supported controllers, then the test is not applicable.

Acceptable error codes for non-supported HCI Remote Name Request Cancel are: 0x01 or, alternately, 0x1F (Unspecified Error) or 0x0C (Command Disallowed).

4.2.1 HCI/GEV/BV-02-C [Disallow Mixing Legacy and Extended Advertising Commands]

- Test Purpose

Verify that each supported legacy and extended advertising command yields a Command Complete event with status 'Command Disallowed' in return when sent after a command of the other type.

- Reference

[9] 3.19.1

- Test Procedure

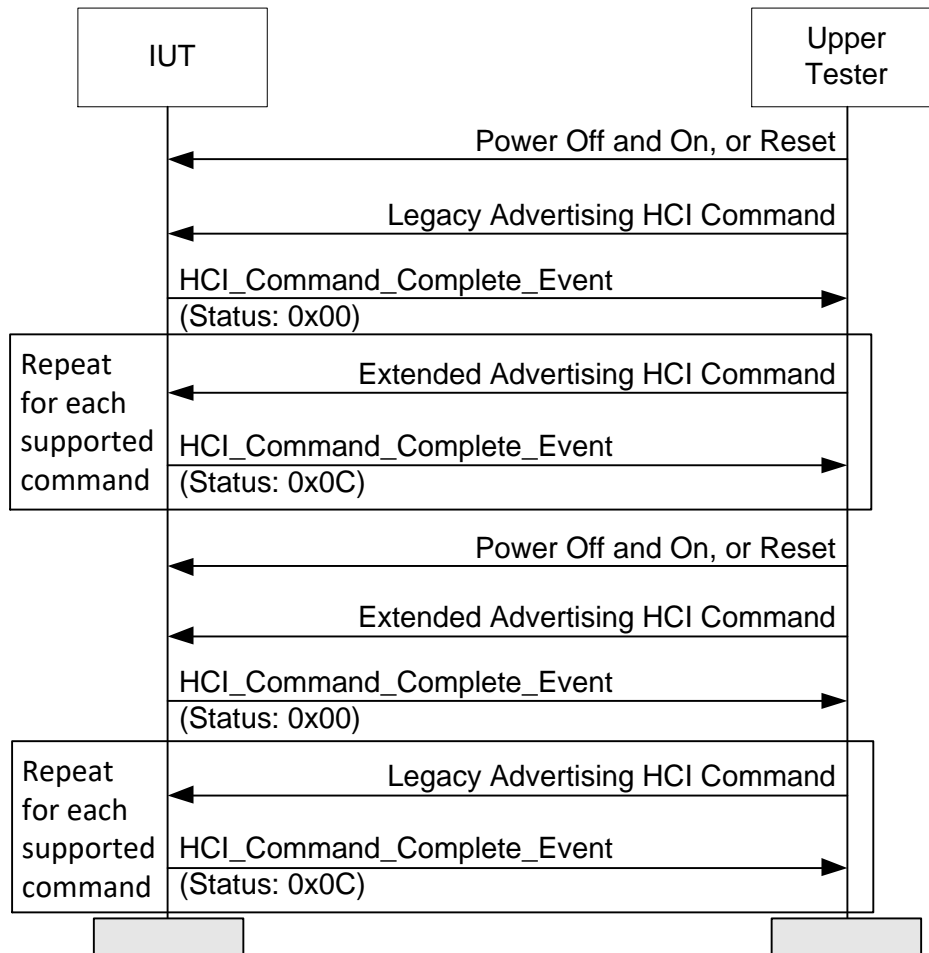


Figure 4.2: HCI/GEV/BV-02-C Disallow Mixing Legacy and Extended Advertising Commands

1. The Upper Tester powers the IUT off and on or sends a reset.
2. The Upper Tester sends an LE Set Advertising Parameters command to the IUT and expects a Command Complete event with Status set to 0x00 (Success) in return.
3. For each command listed in [Table 4.2](#), the Upper Tester sends the command and expects a Command Complete event with Status set as specified in [Table 4.2](#) in return.

Round	Command (Step 3)	Command Complete Event
1	LE Set Extended Advertising Parameters	0x0C (Command Disallowed)
2	LE Set Extended Advertising Data	0x0C (Command Disallowed)
3	LE Set Extended Scan Response Data	0x0C (Command Disallowed)
4	LE Set Extended Advertising Enable	0x0C (Command Disallowed)

Round	Command (Step 3)	Command Complete Event
5	LE Read Maximum Advertising Data Length	0x0C (Command Disallowed)
6	LE Read Number Of Supported Advertising Sets	0x0C (Command Disallowed)
7	LE Remove Advertising Set	0x0C (Command Disallowed)
8	LE Clear Advertising Sets	0x0C (Command Disallowed)
9	LE Set Periodic Advertising Parameters	0x0C (Command Disallowed)
10	LE Set Periodic Advertising Data	0x0C (Command Disallowed)
11	LE Set Periodic Advertising Enable	0x0C (Command Disallowed)
12	LE Set Periodic Advertising Sync Transfer Parameters	0x0C (Command Disallowed) or 0x02 (Unknown Connection Identifier)
13	LE Set Default Periodic Advertising Sync Transfer Parameters	0x0C (Command Disallowed)

Table 4.2: Commands for each case variation

4. The Upper Tester powers the IUT off and on or sends a reset.
5. The Upper Tester sends an LE Set Extended Advertising Parameters command to the IUT and expects a Command Complete event with Status set to 0x00 (Success) in return.
6. For each command listed in [Table 4.3](#), the Upper Tester sends the command and expects a Command Complete event with Status set to 0x0C (Command Disallowed) in return.

Round	Command (Step 6)
1	LE Set Advertising Parameters
2	LE Read Advertising Channel Tx Power
3	LE Set Advertising Data
4	LE Set Scan Response Data
5	LE Set Advertising Enable

Table 4.3: Commands for each case variation

- Expected Outcome

Pass Verdict

After receiving a legacy advertising command, the IUT returns an HCI Command Complete event with Status = Command Disallowed for any extended advertising command.

After receiving an extended advertising command, the IUT returns an HCI Command Complete event with Status = Command Disallowed for any legacy advertising command.

4.2.2 HCI/GEV/BV-03-C [Disallow Mixing Legacy and Extended Scanning Commands]

- Test Purpose

Verify that each supported legacy and extended scanning command yields a Command Complete or Command Status event with status 'Command Disallowed' in return when sent after a command of the other type.

- Reference

[9] 3.19.1

- Test Procedure

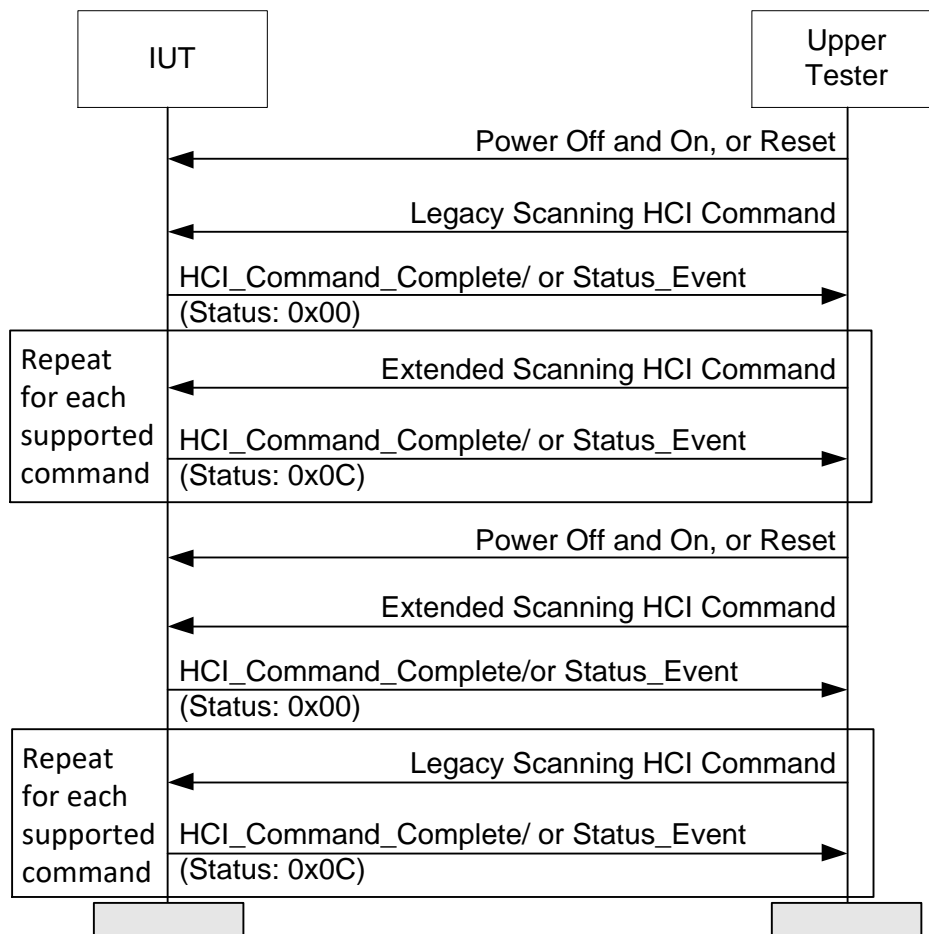


Figure 4.3: HCI/GEV/BV-03-C Disallow Mixing Legacy and Extended Scanning Commands

1. The Upper Tester powers the IUT off and on or sends a reset.
2. The Upper Tester sends an LE Set Scan Parameters command to the IUT and expects a Command Complete event with Status set to 0x00 (Success) in return.
3. For each command listed in [Table 4.4](#), the Upper Tester sends the command and expects a Command Complete or Command Status event with Status set to 0x0C (Command Disallowed) in return.

Round	Command (Step 3)	Associated Event
1	LE Set Extended Scan Parameters	HCI_Command_Complete_Event
2	LE Set Extended Scan Enable	HCI_Command_Complete_Event
3	LE Extended Create Connection	HCI_Command_Status_Event
4	LE Periodic Advertising Create Sync	HCI_Command_Status_Event
5	LE Periodic Advertising Create Sync Cancel	HCI_Command_Complete_Event
6	LE Periodic Advertising Terminate Sync	HCI_Command_Complete_Event
7	LE Add Device To Periodic Advertiser List	HCI_Command_Complete_Event
8	LE Remove Device From Periodic Advertiser List	HCI_Command_Complete_Event
9	LE Clear Periodic Advertiser List	HCI_Command_Complete_Event
10	LE Read Periodic Advertiser List Size	HCI_Command_Complete_Event

Table 4.4: Commands for each case variation

4. The Upper Tester powers the IUT off and on or sends a reset.
5. The Upper Tester sends an LE Set Extended Scan Parameters command to the IUT and expects a Command Complete event with Status set to 0x00 (Success) in return.
6. For each command listed in [Table 4.5](#), the Upper Tester sends the command and expects a Command Complete or Command Status event with Status set to 0x0C (Command Disallowed) in return.

Round	Command (Step 6)	Associated Event
1	LE Set Scan Parameters	HCI_Command_Complete_Event
2	LE Set Scan Enable	HCI_Command_Complete_Event
3	LE Create Connection	HCI_Command_Status_Event

Table 4.5: Commands for each case variation

- Expected Outcome

Pass Verdict

After receiving a legacy scanning command, the IUT returns an HCI Command Complete or Command Status event with Status = Command Disallowed for any extended scanning command.

After receiving an extended scanning command, the IUT returns an HCI Command Complete or Command Status event with Status = Command Disallowed for any legacy scanning command.

4.2.3 HCI/GEV/BV-04-C [Extended Advertising Commands Without Scan Response Data]

- Test Purpose

Verify that LE Extended Advertising Enable command yields a Command Complete event with status 'Command Disallowed' in return when no scan response data has been provided.

- Reference

[9] 7.8.55, 7.8.56

- Test Procedure

1. The Upper Tester powers the IUT off and on or sends a reset.
2. The Upper Tester sends an LE Set Extended Advertising Parameters command to the IUT with scannable advertising property bit set to 1 and expects a Command Complete event with Status set to 0x00 (Success) in return.
3. The Upper Tester sends an LE Set Extended Scan Response Data command to the IUT with no scan response data specified and expects a Command Complete event with Status set to 0x00 (Success) in return.
4. The Upper Tester sends an LE Set Extended Advertising Enable command to the IUT with no scan response data provided and expects a Command Complete event with Status set to 0x0C (Command Disallowed) in return.

- Expected Outcome

Pass Verdict

The IUT returns an HCI Command Complete event with Status set to 0x00 (Success) when Upper Tester sends a HCI LE Set Extended Scan Response Data command with no scan response data.

The IUT returns an HCI Command Complete event with Status set to 0x0C (Command Disallowed) for HCI Set Extended Advertising Enable.

4.3 Device Setup

Test group objectives:

To verify the correct implementation of the Device Setup commands

4.3.1 HCI/DSU/BV-01-C [BR/EDR Controller Reset Command]

- Test Purpose

Verify that the Reset command will reset the Controller, Link Manager, and the Bluetooth radio.



- Reference

[1] 7.3.2

- Initial Condition

See Section 4.1.3.

- Test Procedure

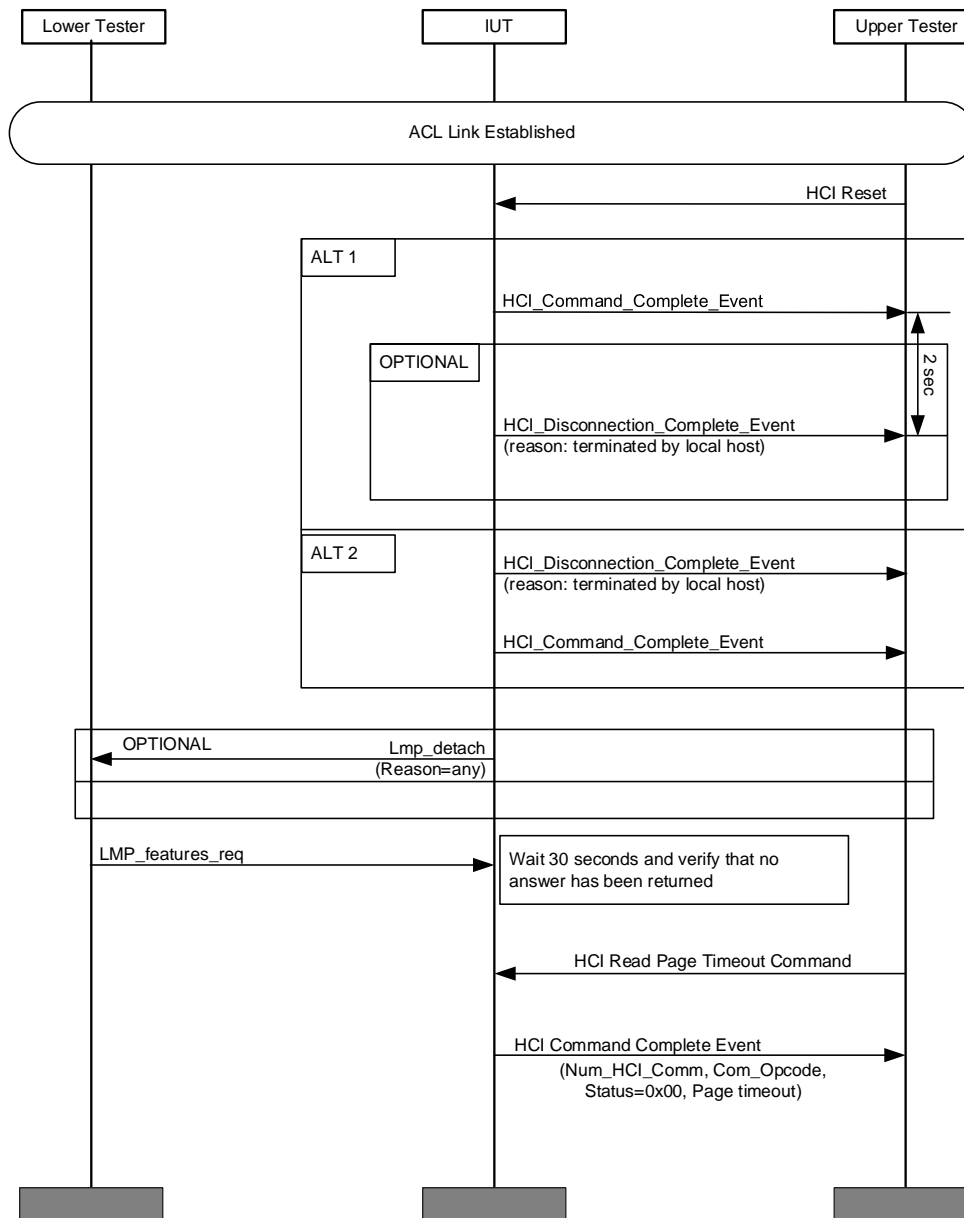


Figure 4.4: HCI/DSU/BV-01-C Reset

- Expected Outcome

Pass Verdict

The IUT disconnects the ACL link after receiving an *HCI_Reset* command.

The IUT returns the default page timeout.

4.3.2 HCI/DSU/BV-02-C [Reset in Advertising State]

- Test Purpose

Verify that after receiving the *HCI_Reset* the Bluetooth LE controller in advertiser state enters into Standby state.

- Reference

[1] 7.3.2

- Initial Condition

The IUT is configured in advertising state.

- Test Procedure

Lower Tester expects *ADV_IND* packets from the IUT.

Upper Tester sends HCI Reset to the IUT and expects the HCI Command Complete Event with Status = Success.

Lower Tester expects no *ADV_IND* packets from the IUT.

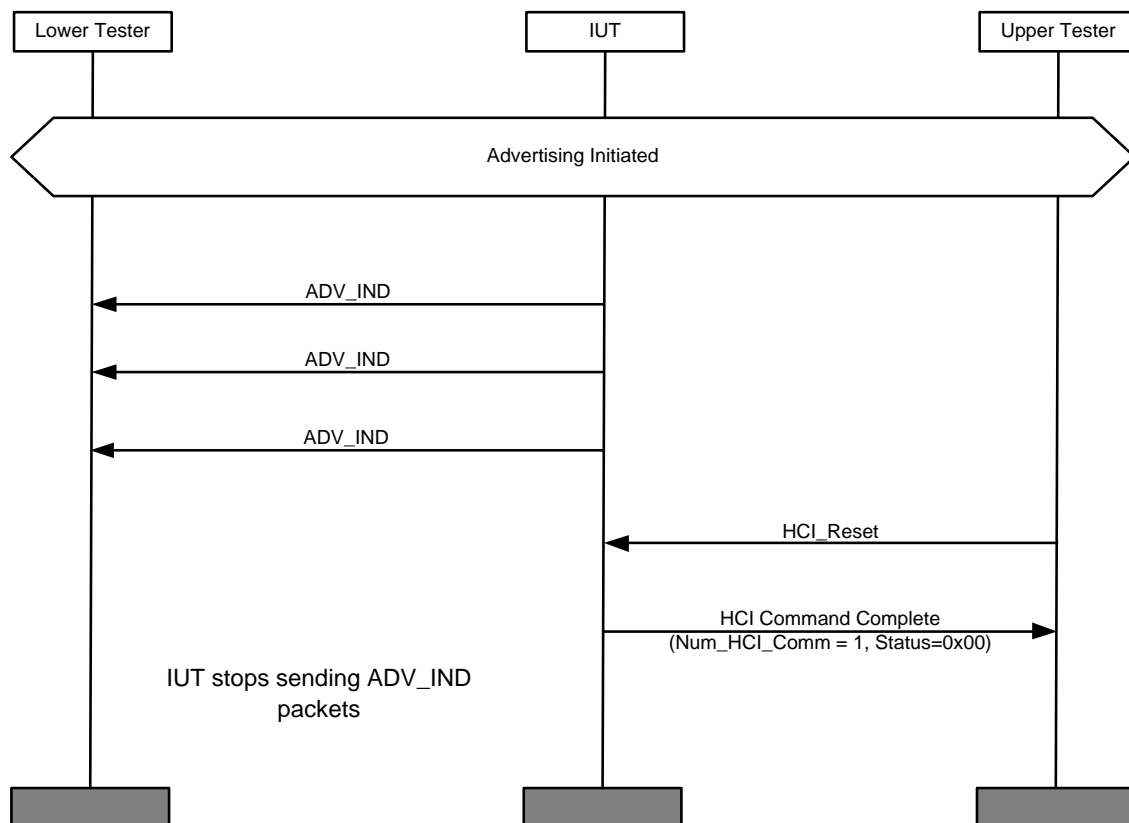


Figure 4.5: HCI/DSU/BV-02-C Reset in advertising state

- Expected Outcome

Pass Verdict

The IUT returns HCI Command Complete Event with Status = Success.

The IUT stops sending *ADV_IND* packets after reset command has been completed.

4.3.3 HCI/DSU/BV-03-C [Reset to Slave]

- Test Purpose

Verify that after receiving the *HCI_Reset* the Bluetooth LE controller in slave role enters into Standby state. Verify that the link layer connection is lost.

- Reference

[1] 7.3.2

- Initial Condition

LL connection established. The IUT is configured as slave.

- Test Procedure

Lower Tester sends data to the IUT and expects data confirmation.

Upper Tester sends *HCI_Reset* to the IUT and expects the HCI Command Complete Event with Status = Success.

Lower Tester continues sending data packets and expects no packets from the IUT until connection timeout expires.

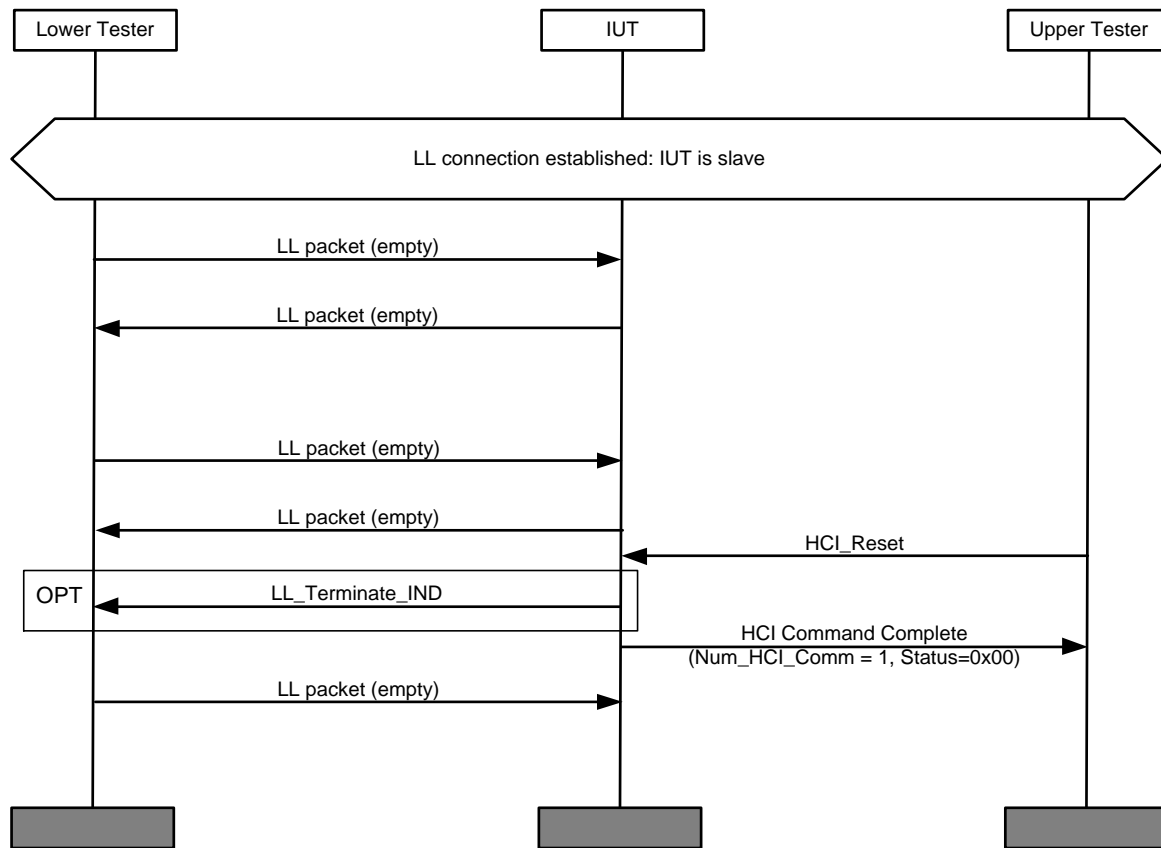


Figure 4.6: HCI/DSU/BV-03-C Reset to slave

- Expected Outcome

Pass Verdict

The IUT returns HCI Command Complete Event with Status = Success.

The IUT stops sending data packets after reset command has been completed.

4.3.4 HCI/DSU/BV-04-C [Reset in Scanning State]

- Test Purpose

Verify that after receiving the *HCI_Reset* the Bluetooth LE controller in scanning state IUT does not send any HCI LE Advertising Report Events.

- Reference

[1] 7.3.2

- Initial Condition

The IUT is configured in passive scanning state. Lower Tester is in advertising state.

- Test Procedure

Upper Tester expects HCI LE Advertising Report Event from IUT.

Upper Tester sends HCI Reset to the IUT and expects the HCI Command Complete Event with Status = Success.

Upper Tester expects no more HCI LE Advertising Report Events from the IUT.

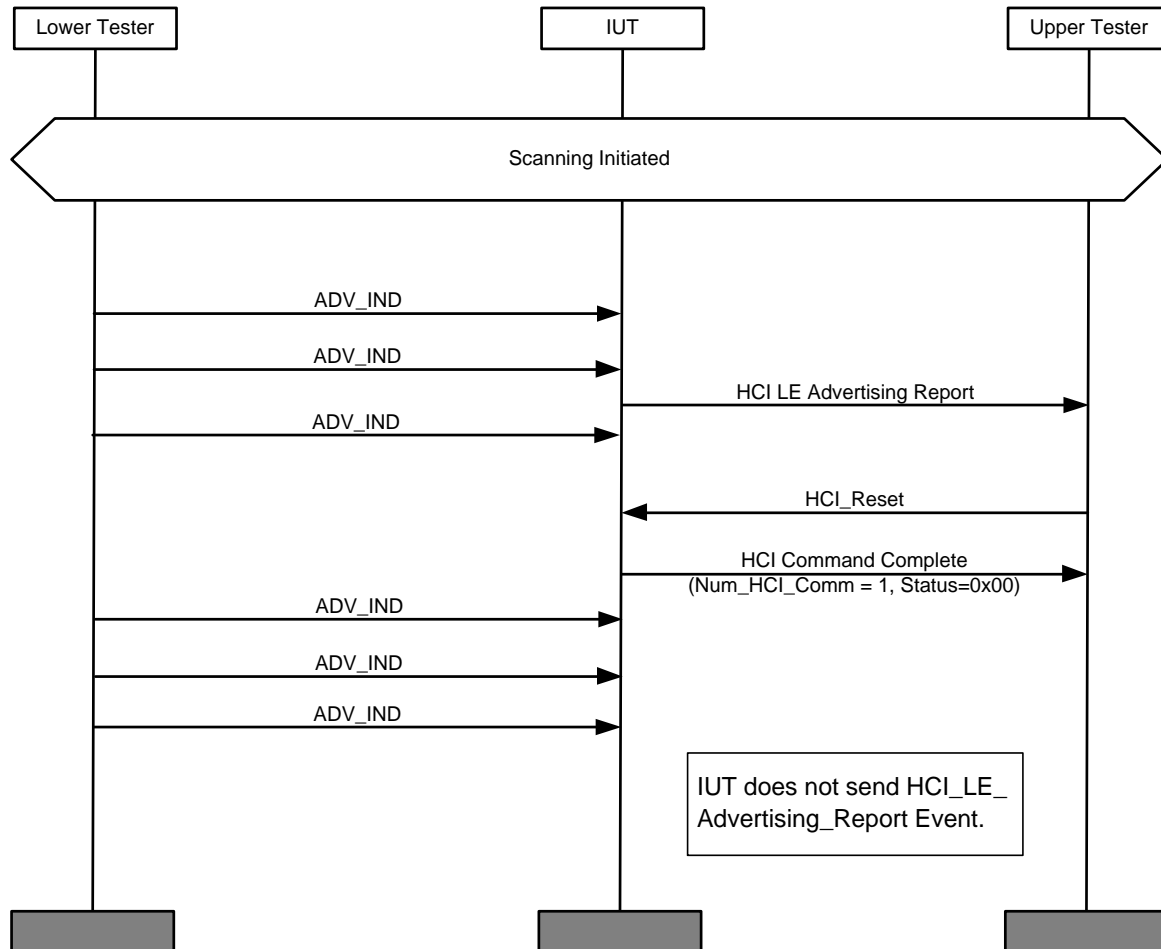


Figure 4.7: HCI/DSU/BV-04-C Reset in scanning state

- Expected Outcome

Pass Verdict

The IUT returns HCI Command Complete Event with Status = Success.

The IUT does not send HCI LE Advertising Report Event after reset.

4.3.5 HCI/DSU/BV-05-C [Reset in Initiating State]

- Test Purpose

Verify that after receiving the *HCI_Reset* the Bluetooth LE controller in initiating state enters into Standby state.

- Reference

[1] 7.3.2

- Initial Condition

IUT is configured to be in initiating state. Lower Tester is in idle state.

- Test Procedure

Upper Tester sends HCI LE Create Connection to the IUT and expects HCI Command Status event with Status = Success.

Upper Tester sends HCI Reset to the IUT and expects the HCI Command Complete event with Status = Success.

After Upper Tester receives command complete for HCI Reset, Lower Tester sends *ADV_IND* packets and expects no *CONNECT_REQ* packets from the IUT.

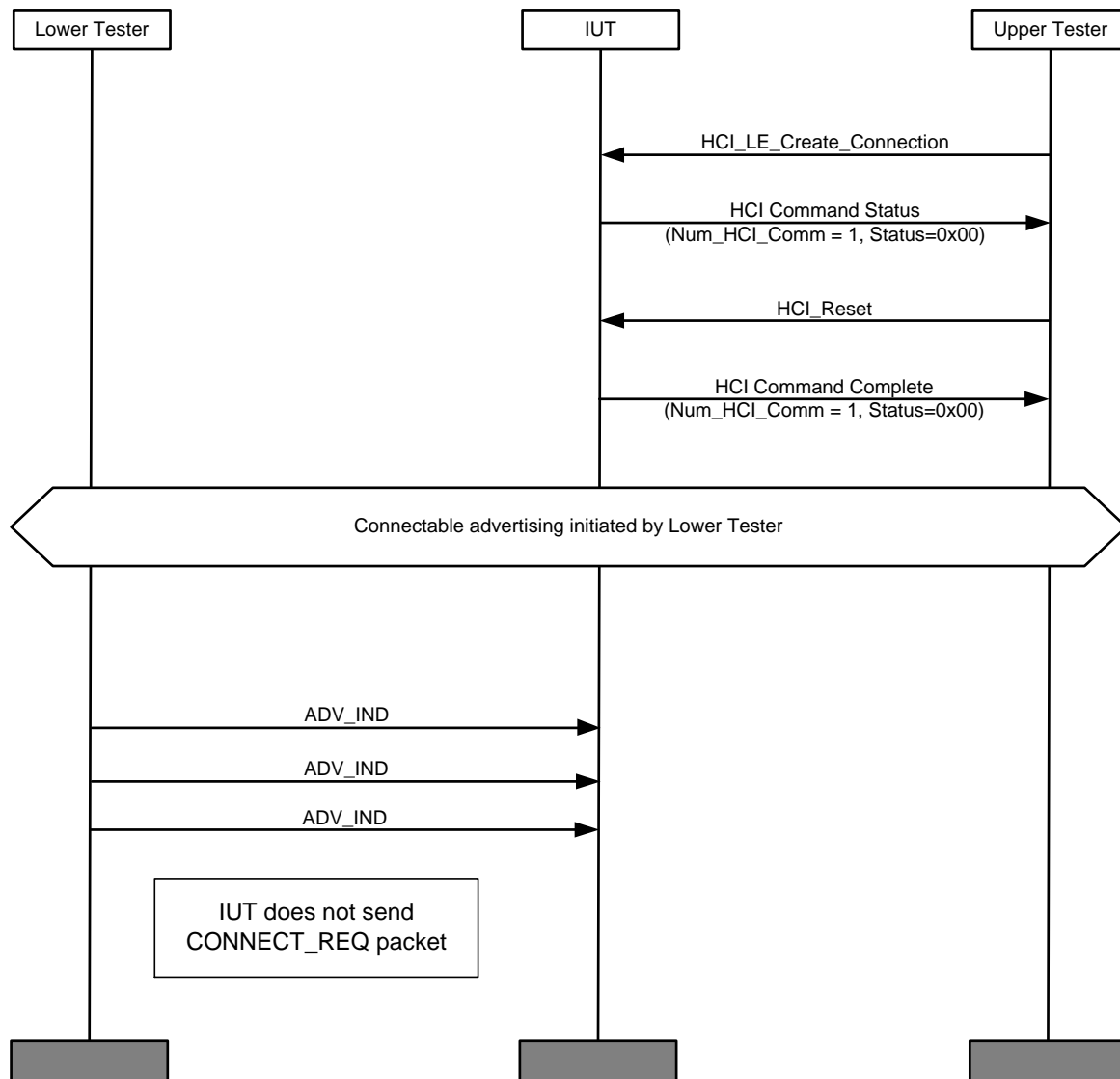


Figure 4.8: HCI/DSU/BV-05-C Reset in initiating state

- Expected Outcome

Pass Verdict

The IUT returns HCI Command Complete Event with Status = Success.

The IUT does not send *CONNECT_REQ* packet after *Command_Complete* event of the Reset command.

The IUT does not return the HCI LE Connection Complete Event.

4.3.6 HCI/DSU/BV-06-C [Reset to Master]

- Test Purpose

Verify that after receiving the *HCI_Reset* the Bluetooth LE controller in master role enters into Standby state. Verify that the link layer connection is lost.

- Reference

[1] 7.3.2

- Initial Condition

LL connection is established. The IUT is configured as master.

- Test Procedure

Lower Tester expects data packets from the IUT and sends confirmation.

Upper Tester sends HCI Reset to the IUT and expects the HCI Command Complete Event with Status = Success.

Lower Tester expects no packets from the IUT until connection timeout expires.

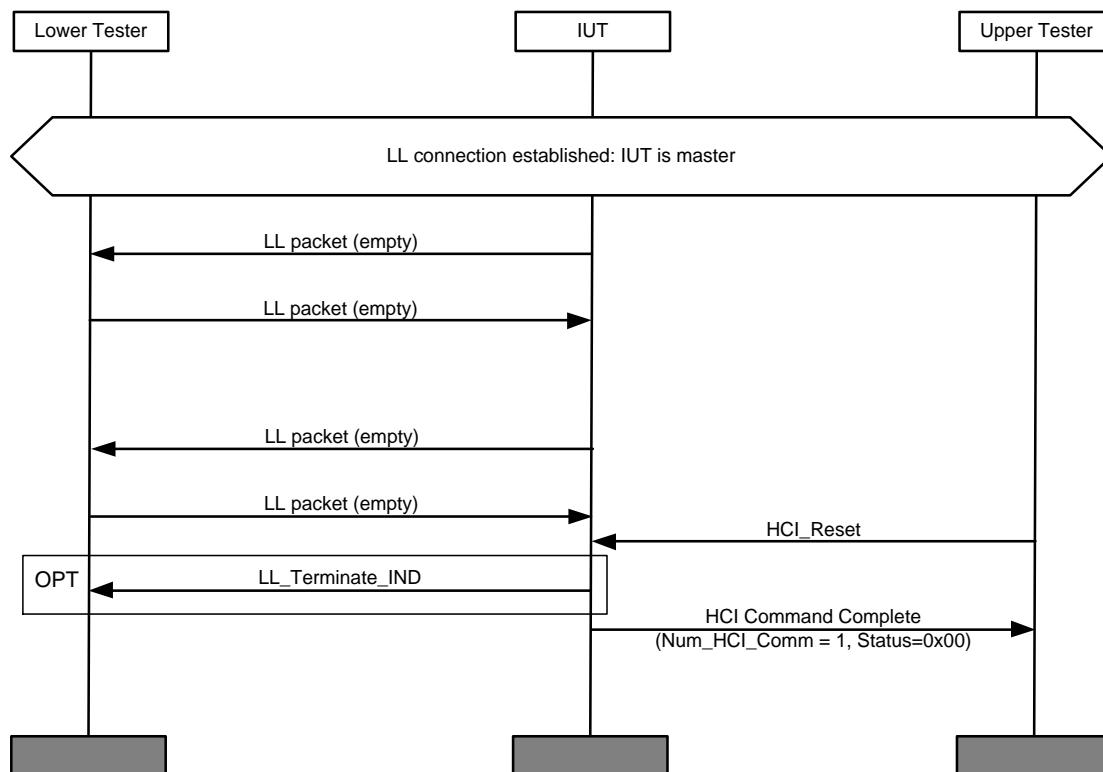


Figure 4.9: HCI/DSU/BV-06-C Reset to master

- Expected Outcome

Pass Verdict

The IUT returns HCI Command Complete Event with Status = Success.

The IUT stops sending data packets after reset command has been completed.

4.3.7 HCI/DSU/BV-07-C [AMP Controller Reset Command]

- Test Purpose

Verify that the Reset Command will reset the HCI and the AMP PAL.

- Reference

[\[1\]](#) 7.3.2

- Initial Condition

See Section [4.1.3](#).

- Test Procedure

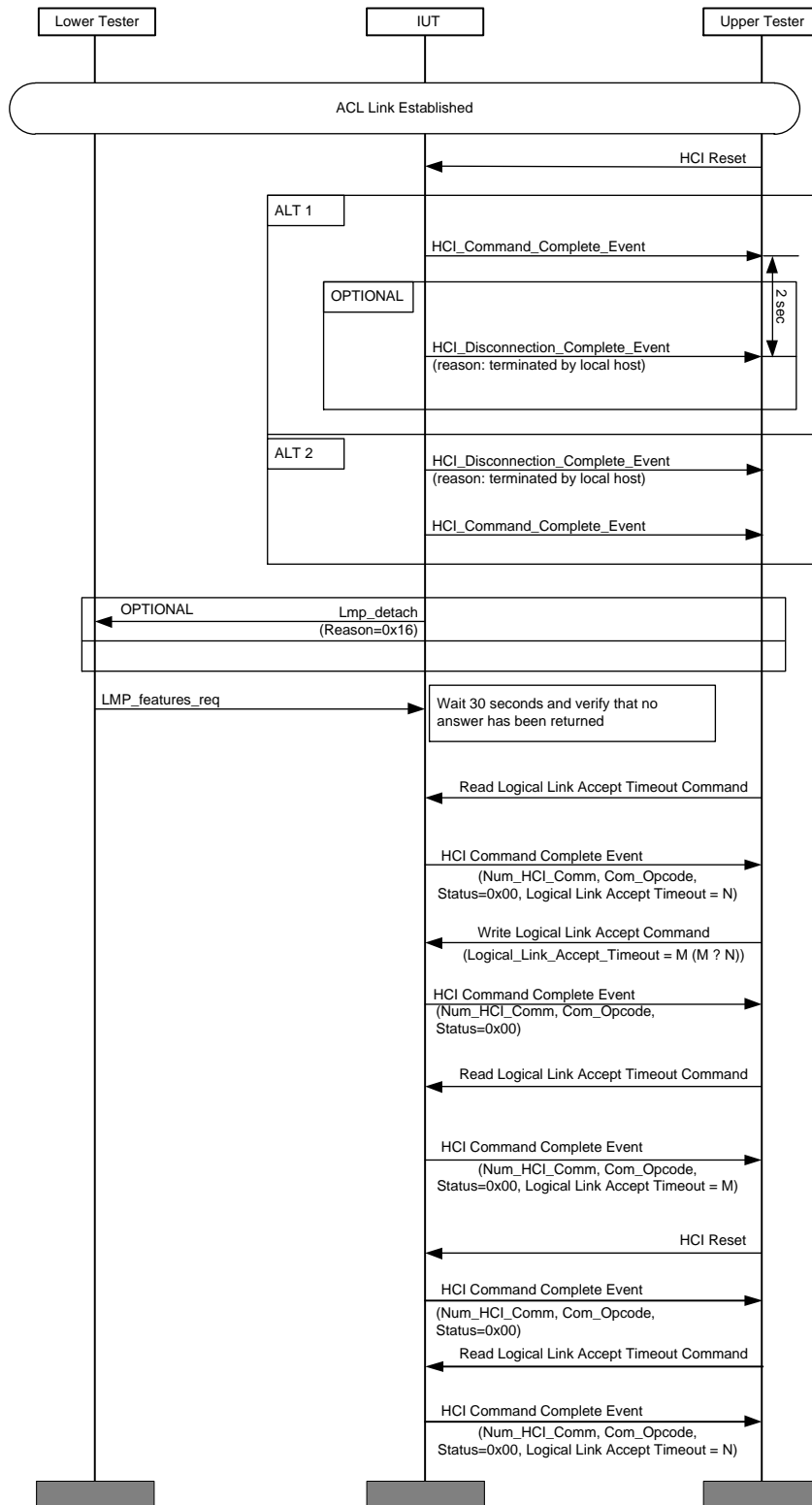


Figure 4.10: HCI/DSU/BV-07-C AMP Controller Reset Command

- Expected Outcome

Pass Verdict

The IUT returns the default Logical Link Accept Timeout.

4.4 Controller Flow Control

Test group objectives:

To verify the correct implementation of the Controller Flow Control commands

4.4.1 HCI/CFC/BV-01-C [Read Buffer Size Command]

- Test Purpose

Verify that the Read Buffer Size command returns the buffer size, and that when data is transferred a 'number of completed packets' response is returned per packet.

- Reference

[1] 7.4.5

- Initial Condition

The IUT is in STANDBY mode 3.

- Test Procedure

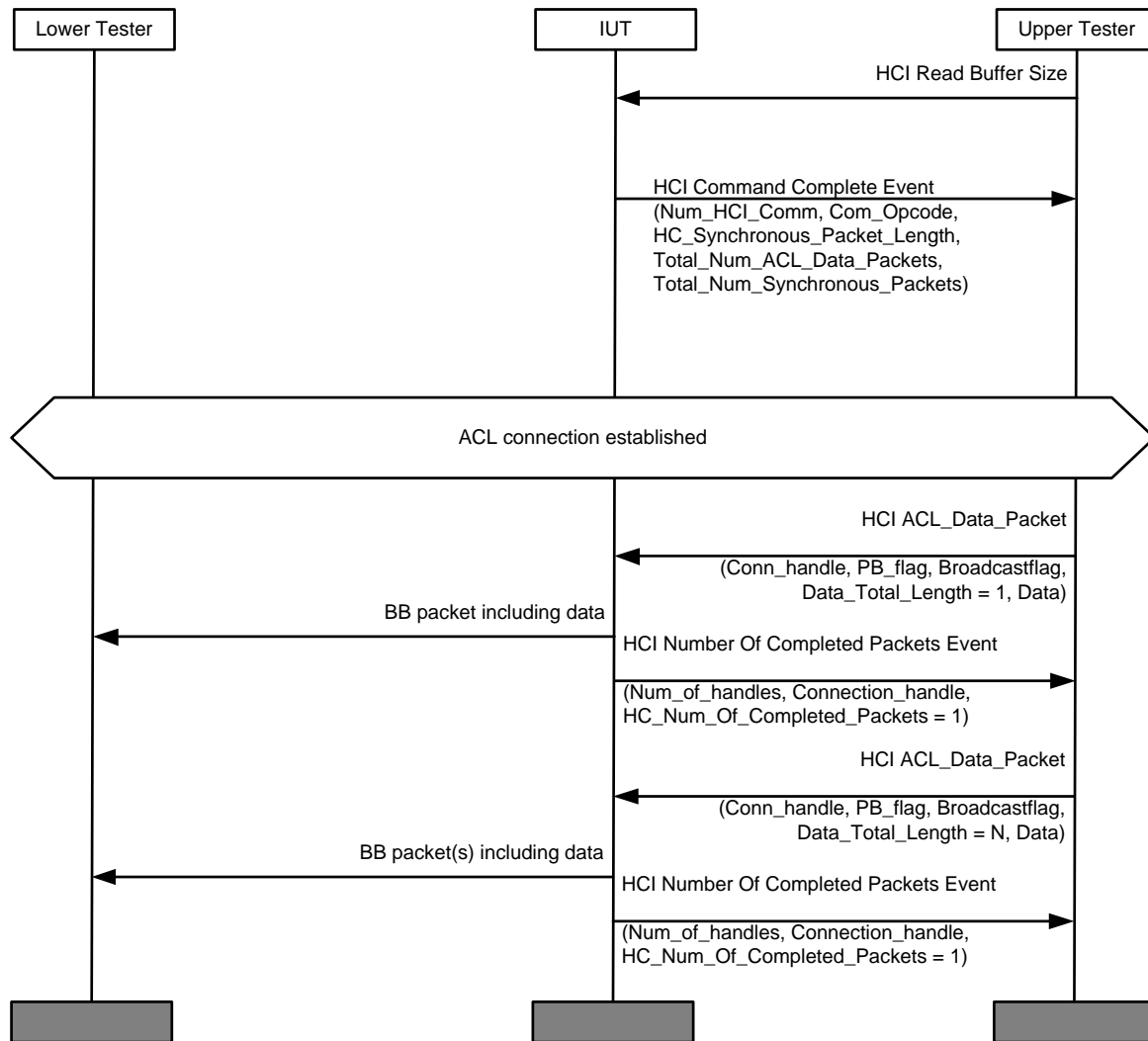


Figure 4.11: HCI/CFC/BV-01-C Read Buffer Size

- Expected Outcome

Pass Verdict

The IUT returns one 'number of completed packets' response per packet for one byte packets.

The IUT returns one 'number of completed packets' response per packet for buffer sized packets.

- Notes

All packets sent over HCI shall be valid L2CAP packets. In the first part of the test the single byte data payload shall be encoded as an L2CAP packet with four byte L2CAP header. For the second part of the test for a buffer size N the data payload shall be N-4 to allow for the L2CAP header.

4.4.2 HCI/CFC/BV-02-C [Buffer Size]

- Test Purpose

Verify that IUT returns the buffer size of the controller when receiving the LE Read Buffer Size command or Read Buffer Size command.

- Reference

[1] 7.4.5, 7.8.2

- Initial Condition

No LL connection exists.

- Test Procedure

Upper Tester sends HCI LE Read Buffer Size and expects HCI Command Complete Event in response with Status = Success.

If Data Packet Length and Num Data Packets parameters are set to 0, Upper Tester sends HCI Read Buffer Size and expects HCI Command Complete Event in response with Status = Success and Data Packet Length and Num Data Packets parameters different from 0.

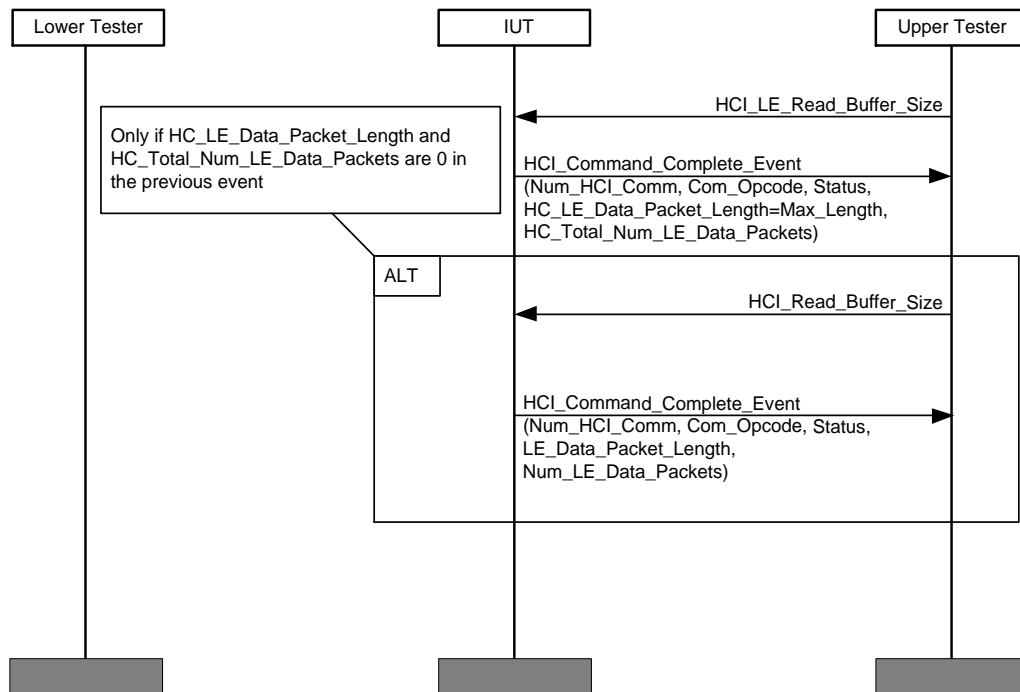


Figure 4.12: HCI/CFC/BV-02-C Buffer size

- Expected Outcome

Pass Verdict

The IUT returns HCI Command Complete Event with Status = Success and Data Packet Length and Num Data Packet parameters with correct values.

4.5 Controller Information

Test group objectives:

To verify the correct implementation of the Controller Information commands.

4.5.1 HCI/CIN/BV-01-C [Read Local Supported Features Command]

- **Test Purpose**
Verify that the Read Local Supported Features command returns with the correct features supported.
- **Reference**
[\[1\]](#) 7.4.3
- **Initial Condition**
No LL connection exists.
- **Test Procedure**

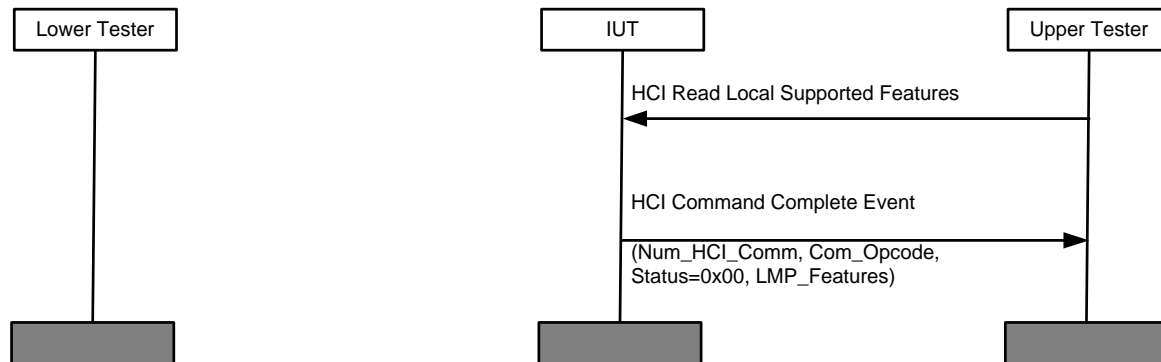


Figure 4.13: HCI/CIN/BV-01-C Read Local Supported Features

- **Test Condition**
The manufacturer of the IUT must define features supported.
- **Expected Outcome**
Pass Verdict

The IUT returns parameter LMP_features containing features supported defined by the ICS as mapped by Table 4.2 in [\[5\]](#).

4.5.2 HCI/CIN/BV-02-C [Read Local Extended Features Command]

- **Test Purpose**
Verify that the Read Local Extended Features command returns with the correct features supported.
- **Reference**
[\[1\]](#) 7.4.4

- Initial Condition
No LL connection exists.
- Test Procedure

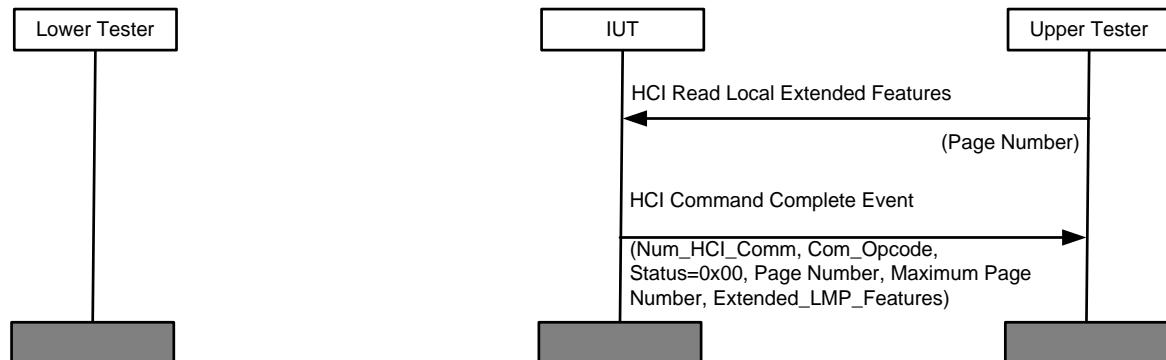


Figure 4.14: HCI/CIN/BV-02-C Read Local Extended Features

- Test Condition
The manufacturer of the IUT must define the extended features supported.
- Expected Outcome
Pass Verdict

The IUT returns the requested page of extended LMP_features containing features supported defined by the ICS as mapped by Table 4.2 in [5].

4.5.3 HCI/CIN/BV-03-C [Read Local Supported Commands Command]

- Test Purpose
Verify that the Read Local Supported Commands command returns with the correct commands supported.
- Reference
[1] 7.4.2
- Initial Condition
No LL connection exists.

- Test Procedure

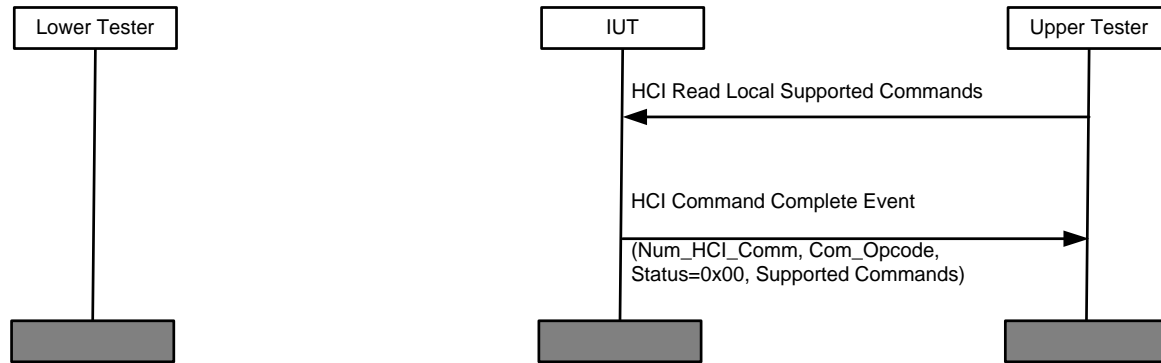


Figure 4.15: HCI/CIN/BV-03-C Read Local Supported Commands

- Test Condition

The manufacturer of the IUT must define the commands supported.

- Expected Outcome

Pass Verdict

The IUT returns the Supported Commands configuration parameter with the correct commands supported.

4.5.4 HCI/CIN/BV-04-C [Read Local Version Information Command]

- Test Purpose

Verify that the Read Local Version Information command returns with the correct versions.

- Reference

[1] HCI 7.4.1

- Initial Condition

No LL connection exists.

- Test Procedure

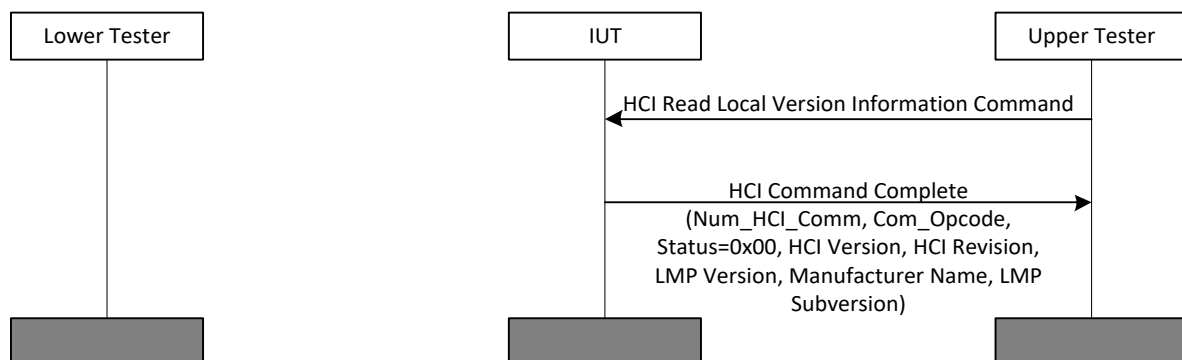


Figure 4.16: HCI/CIN/BV-04-C Read Local Version Information

- Test Condition

The manufacturer of the IUT must define versions supported.

- Expected Outcome

Pass Verdict

The IUT returns command complete with the version information containing HCI Version and LMP Version as defined in Bluetooth assigned numbers and HCI Revision, Manufacturer Name and LMP Subversion as defined by the manufacturer.

4.5.5 HCI/CIN/BV-06-C [White List Size]

- Test Purpose

Verify that the IUT responds with the number of empty entries that the radio has in its device addresses list.

- Reference

[1] 7.8.17

- Initial Condition

The IUT is not connected to the Lower Tester.

- Test Procedure

Upper Tester sends HCI LE Clear White List.

Upper Tester reads the IUT's white list size. Upper Tester expects HCI Command Complete Event with White List Size parameter equal or greater than 1.

Upper Tester adds different addresses until the list is full.

Upper Tester adds one more address and expects the IUT to return an HCI Command Complete Event with Status = Memory Capacity Exceeded.

Upper Tester removes one address from the white list so that there is now space for one more address.

Upper Tester adds another address and expects the IUT to return an HCI Command Complete Event with Status = Success.

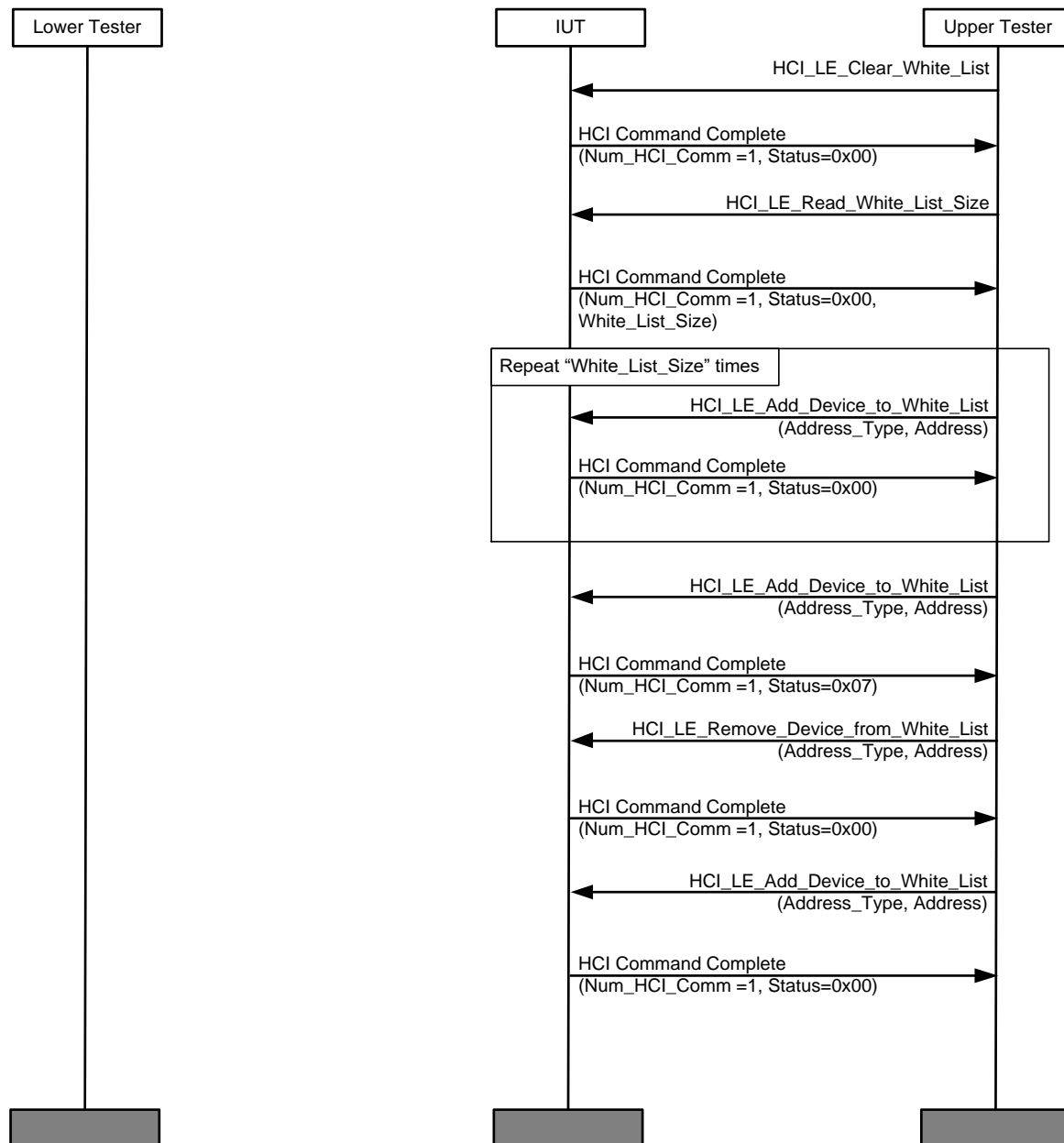


Figure 4.17: HCI/CIN/BV-06-C White List Size

- Expected Outcome

Pass Verdict

The IUT returns HCI Command Complete Event with Status = Success in response to HCI LE Read White List Size command and with White List Size parameter greater or equal to 0x01.

The IUT returns HCI Command Complete with Status = Success in response to HCI Add Device to White List command while there is enough space in the list.

The IUT returns HCI Command Complete with Status = Memory Capacity Exceeded in response to HCI Add Device to White List command while there is not enough space in the list.

The IUT returns HCI Command Complete with Status = Success in response to HCI Remove Device from White List command.

The IUT returns HCI Command Complete with Status = Success in response to HCI Add Device to White List command.

4.5.6 HCI/CIN/BV-07-C [REMOVED TEST]

Test deleted. Section intentionally left blank

4.5.7 HCI/CIN/BV-08-C [Read Local Simple Pairing Options Command]

- Test Purpose

Verify that the Read Local Simple Pairing Options command returns with the correct options and key size supported.

- Reference

[11] 7.4.9

- Initial Condition

The IUT is not connected to the Lower Tester.

- Test Procedure

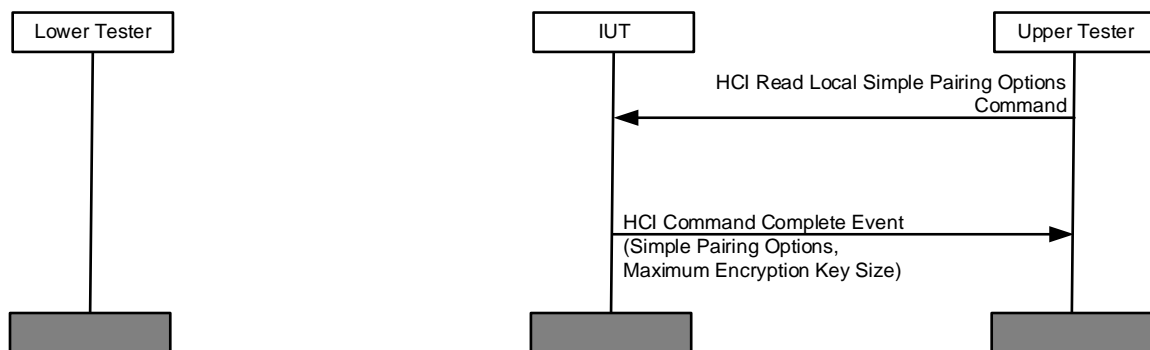


Figure 4.18: HCI/CIN/BV-08-C Read Local Simple Pairing Options Command

- Test Condition

The manufacturer of the IUT supports remote public key validation performed and maximum encryption key size.

- Expected Outcome

Pass Verdict

The IUT has set the 'Remote public key validation is always performed' (bit 0) in the Simple Pairing Options Field to 1.

The IUT returns a Maximum Encryption Key Size greater than or equal to 0x07 and less than or equal to 0x10.

4.5.8 HCI/CIN/BV-09-C [Read LE Public Key Validation Feature Bit]

- **Test Purpose**
Verify that the LE Read Local Supported Features command returns with the Remote Public Key Validation feature bit enabled.
- **Reference**
[\[1\]](#) 7.4.3
- **Initial Condition**
The IUT is not connected to the Lower Tester.

- **Test Procedure**

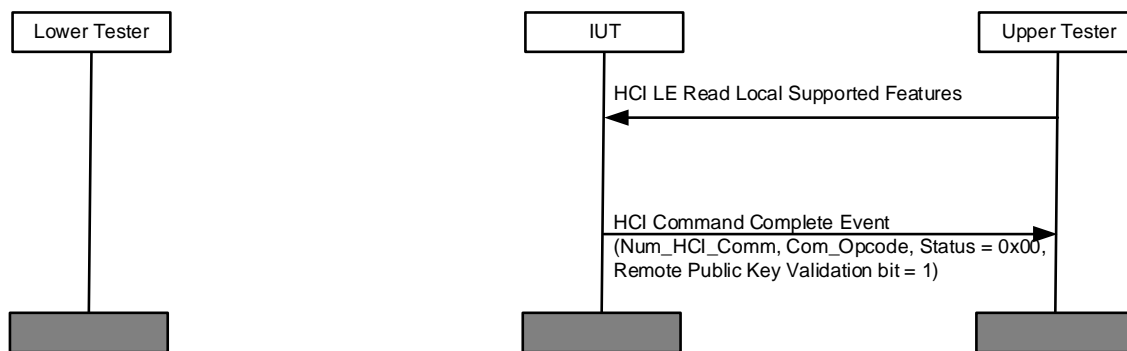


Figure 4.19: HCI/CIN/BV-09-C Read LE Public Key Validation Feature Bit Test Condition

- **Expected Outcome**
Pass Verdict

The IUT returns a FeatureSet field with the Remote Public Key Validation bit set to 1.

4.6 Device Discovery

Test group objectives:

To verify the correct implementation of the Device Discovery commands.

4.6.1 HCI/DDI/BV-01-C [Periodic Inquiry Mode Command]

- **Test Purpose**
Verify that the Periodic Inquiry Mode command configures the IUT to enter the Periodic Inquiry Mode, and that the Exit Periodic Inquiry Mode command configures the IUT to exit Periodic Inquiry Mode.
- **Reference**
[\[1\]](#) 7.1.3, 7.1.4
- **Initial Condition**
IUT must be configured as master.

The IUT is in STANDBY mode.

- Test Procedure

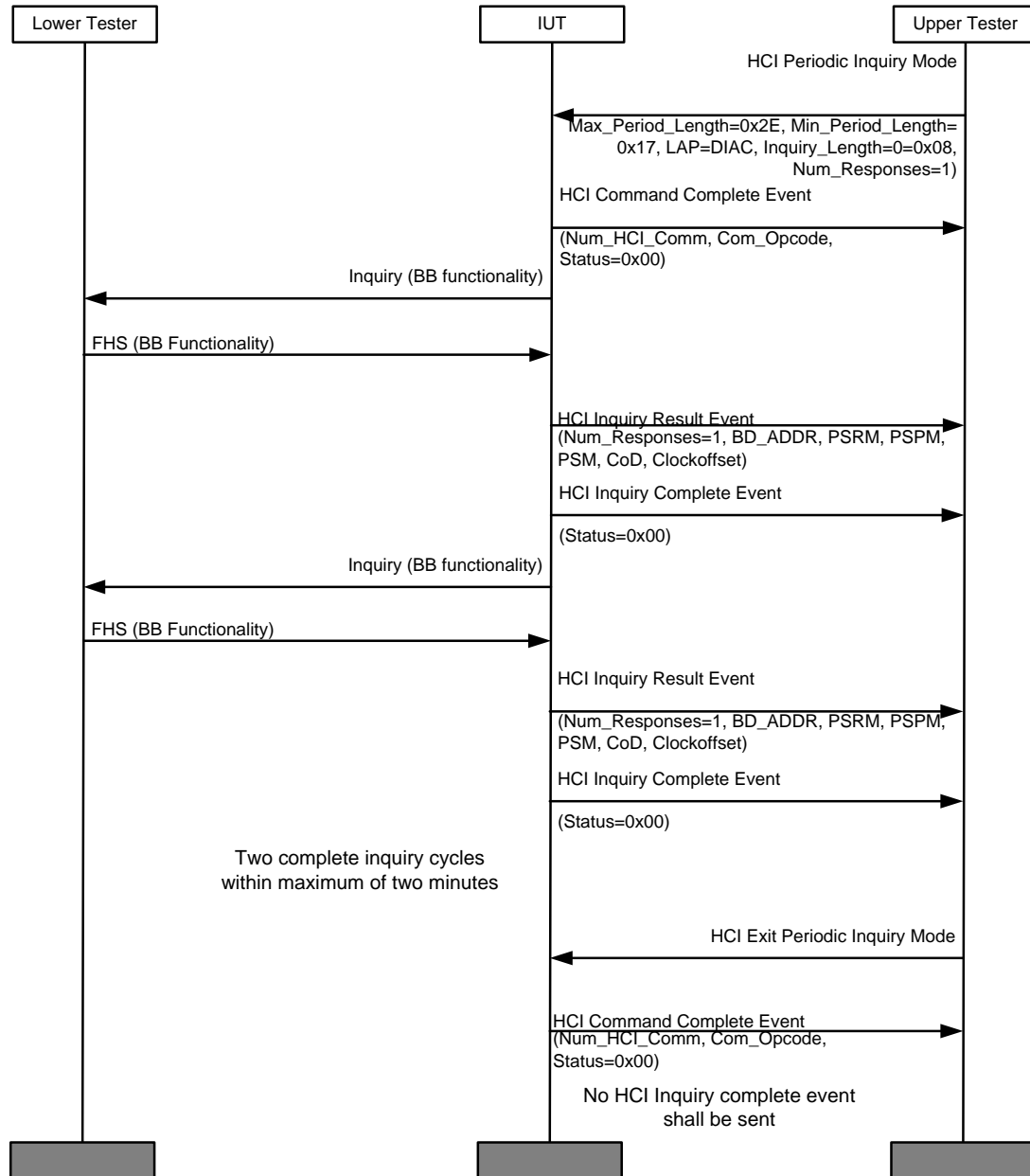


Figure 4.20: HCI/DDI/BV-01-C Periodic Inquiry Mode

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the Periodic Inquiry Mode command.

The IUT returns an 'Inquiry Result' during each inquiry period.

The IUT returns an 'Inquiry Complete' event at the end of each inquiry period.

The IUT returns 'command complete' succeeded to the Exit Periodic Inquiry Mode command.

The IUT does not return an Inquiry Complete event after the periodic inquiry is exited.

4.6.2 HCI/DDI/BV-02-C [Write Inquiry Mode Command]

- Test Purpose

Verify that the Write Inquiry Mode command writes the Inquiry Mode configuration parameter of the IUT, and that Read Inquiry Mode command returns the Inquiry Mode configuration parameter of the IUT.

- Reference

[1] 7.3.53, 7.3.54

- Initial Condition

IUT must be configured as master.

The IUT is in STANDBY mode.

- Test Procedure

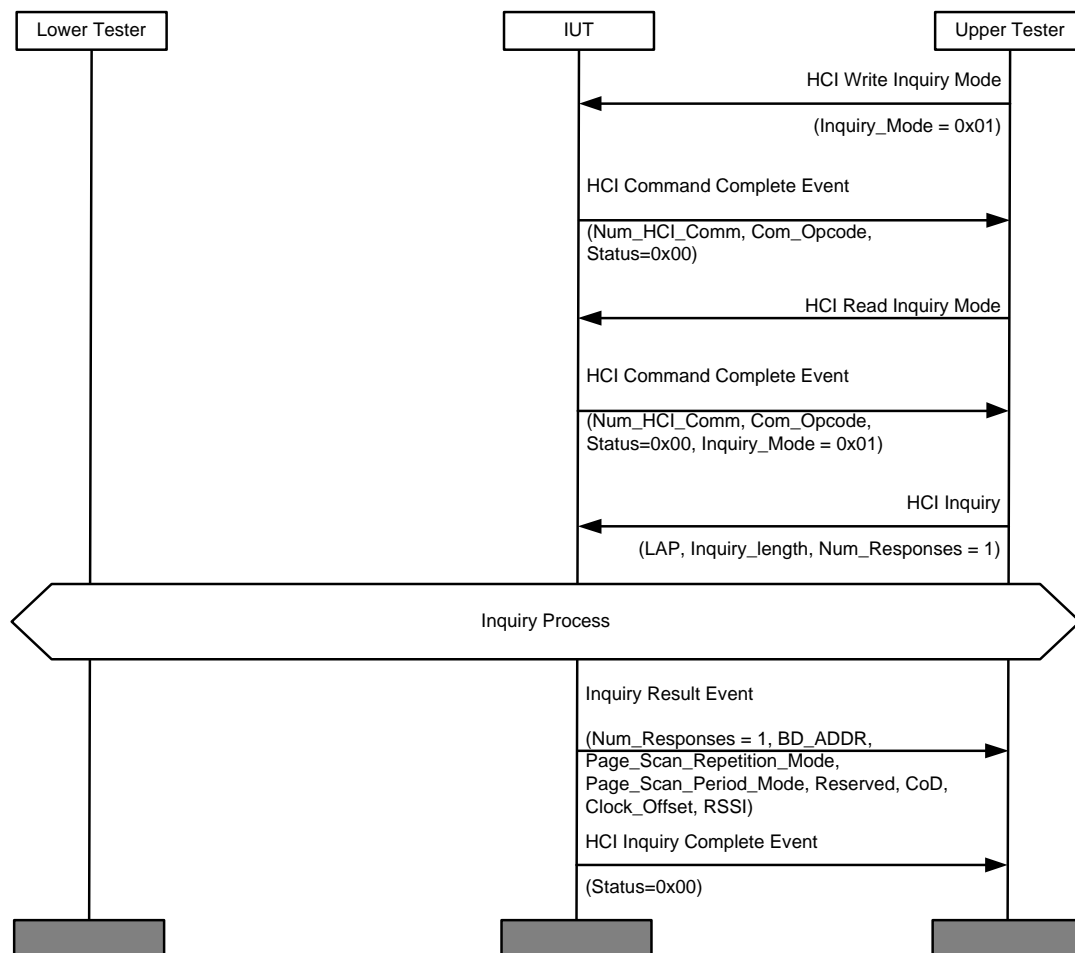


Figure 4.21: HCI/DDI/BV-02-C Write Inquiry Mode

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the Write Inquiry Mode command.

The IUT returns the Inquiry_Mode parameter with result 'Inquiry Result format with RSSI'. The IUT returns an inquiry result with RSSI.

4.6.3 HCI/DDI/BV-03-C [Set Advertising Enable]

- Test Purpose

Verify that the IUT stops advertising when receiving HCI LE SetAdvertising Enable with the parameter Advertising Enable set to Disabled.

- Reference

[\[1\]](#) 7.8.10

- Initial Condition

The IUT is configured in the advertising state.

- Test Procedure

Lower Tester expects ADV_IND packets from the IUT.

Upper Tester sends HCI LE SetAdvertising Enable with parameter Advertising Enable set to Disabled to the IUT and expects the HCI Command Complete Event with Status = Success.

Lower Tester expects no ADV_IND packets from the IUT.

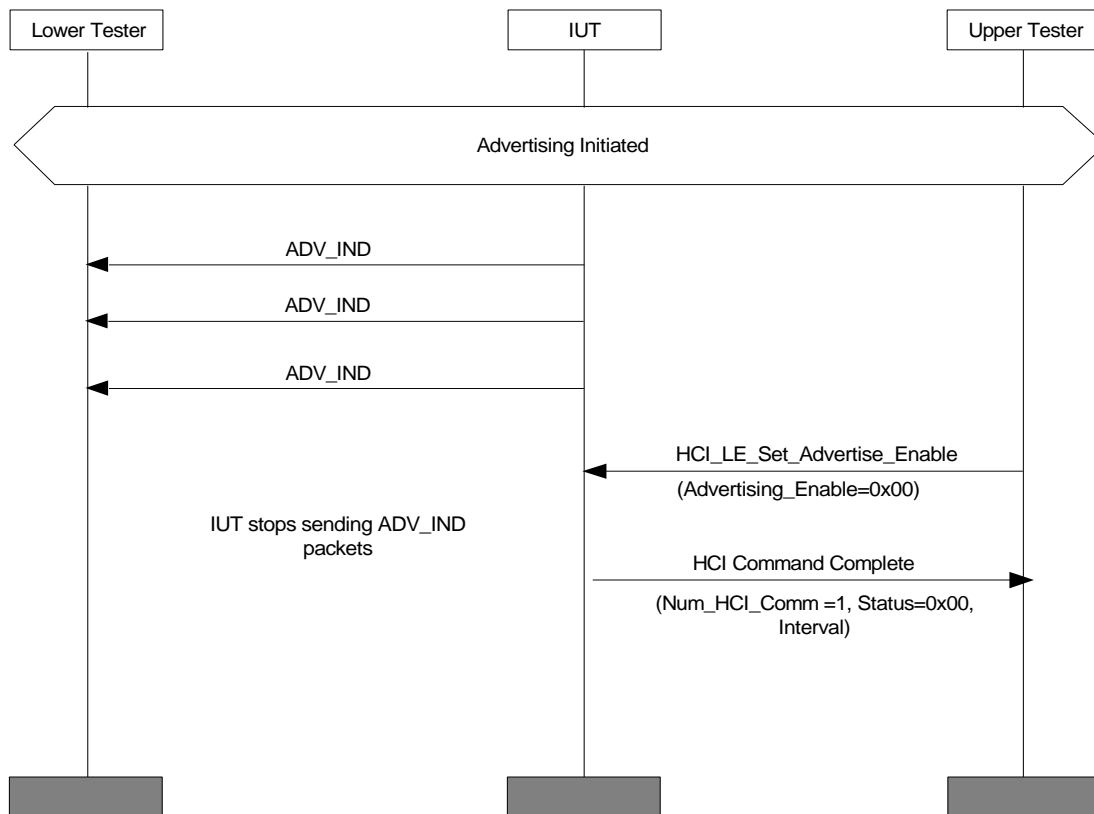


Figure 4.22: HCI/DDI/BV-03-C SetAdvertising enable

- Expected Outcome

Pass Verdict

The IUT returns HCI Command Complete Event with Status = Success.

The IUT stops sending ADV_IND packets.

4.6.4 HCI/DDI/BV-04-C [Set Scan Enable]

- Test Purpose

Verify that the IUT stops scanning when receiving HCI LE SetScan Enable with the parameter LE Scan Enable set to Disabled.

- Reference

[1] 7.8.12

- Initial Condition

The IUT is configured as passive scanner. Lower Tester is advertiser.

- Test Procedure

Upper Tester expects HCI LE Advertising Report Event from IUT.

Upper Tester sends HCI LE SetScan Enable with LE Scan Enable parameter set to Disabled to the IUT and expects the HCI Command Complete Event with Status = Success.

Upper Tester expects no more HCI LE Advertising Report Events from the IUT.

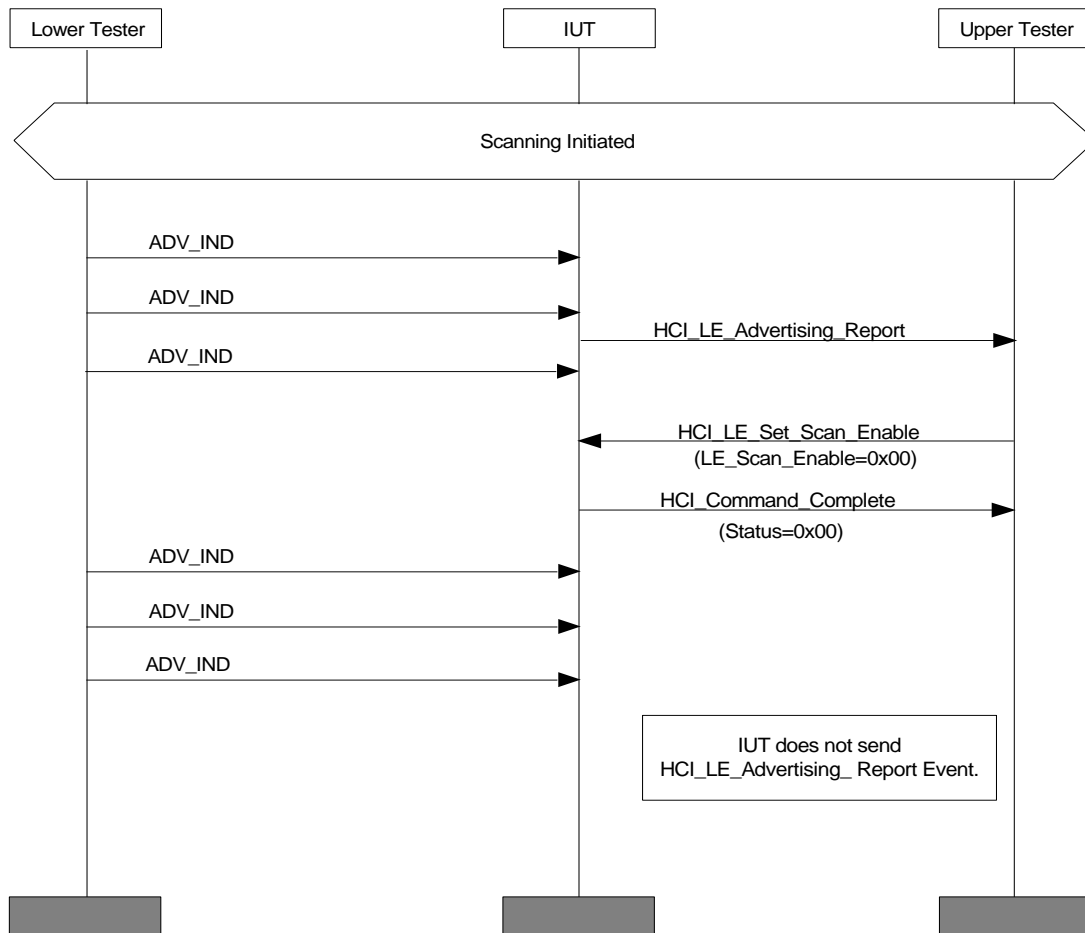


Figure 4.23: HCI/DDI/BV-04-C Set scan enable

- Expected Outcome

Pass Verdict

The IUT returns HCI Command Complete Event with Status = Success.

The IUT does not send any more LE Advertising Report Events after it sends the HCI_Command_Complete for the HCI_LE_Set_Scan_Enable command that disables scanning.

4.6.5 HCI/DDI/BV-05-C [Read Extended Inquiry Length]

- Test Purpose

Verify that the IUT correctly handles Read Extended Inquiry Length.

- Reference

[1] 7.3.98

- Initial Condition
IUT is in standby.
- Test Procedure
 - a) Upper Tester issues HCI_Write_Extended_Inquiry_Length Command with preset information to the IUT.
 - b) Upper Tester receives success status in the HCI_Write_Extended_Inquiry_Length Command complete event.
 - c) Upper Tester issues HCI_Read_Extended_Inquiry_Length Command to the IUT.

- Expected Outcome

Pass Verdict

Upper Tester receives command complete event with success status for the commands sent in a and c. Upper Tester receives the data returned by the HCI_Read_Extended_Inquiry_Length Command complete event. The received data matches that was used in the HCI_Write_Extended_Inquiry_Length Command.

4.6.6 HCI/DDI/BI-01-C [Reject Invalid Extended Advertising Parameters]

- Test Purpose
Verify that the IUT properly rejects an invalid advertising interval provided to the HCI_LE_Set_Extended_Advertising_Parameters command and returns the expected error code.
- Reference
[\[9\]](#) 7.8.53
- Initial Condition
IUT is not currently advertising.

The minimum Primary_Advertising_Interval_Min value (TSPX_adv_interval_min) supported by the Controller is declared by the equipment manufacturer as an IXIT value.
- Test Procedure
Upper Tester sends the HCI_LE_Set_Extended_Advertising_Parameters command to the IUT with the Advertising_Event_Properties parameter set to 00110000b (ADV_NONCONN_IND legacy PDU), the Primary_Advertising_Interval_Max field set to TSPX_adv_interval_min minus one, and Primary_Advertising_Interval_Min set to TSPX_adv_interval_min minus two.

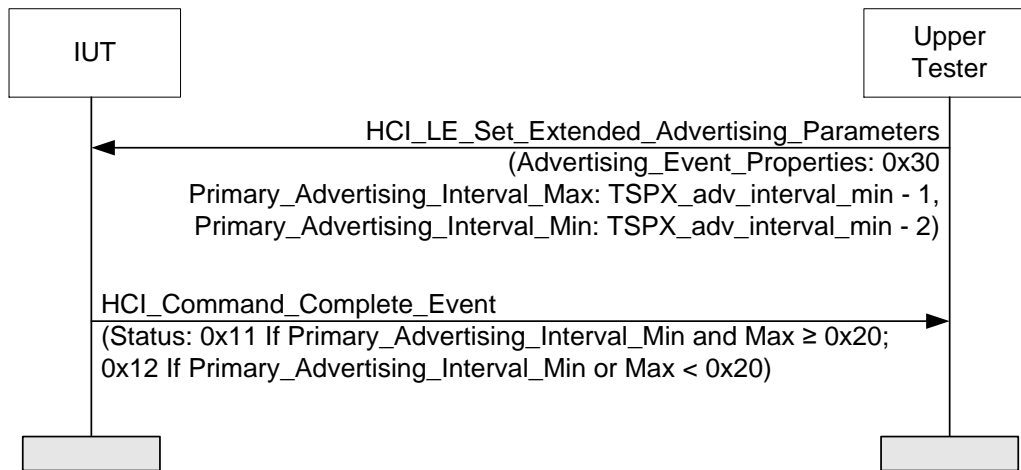


Figure 4.24: HCI/DDI/BI-01-C [Reject Invalid Extended Advertising Parameters]

- Expected Outcome

Pass Verdict

Command Complete event for HCI_LE_Set_Extended_Advertising_Parameters is received by the Upper Tester.

- If either Primary_Advertising_Interval_Min or Max is less than 0x20 the error code shall be 0x12 (Invalid HCI Command Parameter).
- If both Primary_Advertising_Interval_Min and Max are 0x20 or greater the error code shall be 0x11 (Unsupported Feature or Parameter Value).

4.6.7 HCI/DDI/BI-02-C [Reject Invalid Advertising Parameters]

- Test Purpose

Verify that the IUT properly rejects an invalid advertising interval provided to the HCI_LE_Set_Advertising_Parameters command and returns the expected error code.

- Reference

[9] 7.8.5

- Initial Condition

IUT is not currently advertising.

- Test Procedure

Upper Tester sends the HCI_LE_Set_Advertising_Parameters to the IUT with the Advertising_Type field set to 0x03 (ADV_NONCONN_IND), the Advertising_Interval_Max field set to TSPX_adv_interval_min minus one, and Advertising_Interval_Min set to TSPX_adv_interval_min minus two.

- Expected Outcome

Pass Verdict

Command Complete event for HCI_LE_Set_Advertising_Parameters is received by the Upper Tester.

- If either Advertising_Interval_Min or Advertising_Interval_Max, or both are less than 0x20 the error code shall be 0x12 (Invalid HCI Command Parameter).
- If both Advertising_Interval_Min and Advertising_Interval_Max are 0x20 or greater the error code shall be 0x11 (Unsupported Feature or Parameter Value).

4.6.8 HCI/DDI/BV-03-C [Reject LE Periodic Advertising Create Sync Command With Disallowed Reporting Options]

- Test Purpose

Verify that the IUT properly rejects disallowed reporting options provided to the HCI_LE_Periodic_Advertising_Create_Sync command and returns the expected error code.

- Reference

[12] 7.8.67

- Initial Condition

The Lower Tester is advertising with extended advertising and periodic advertising.

The IUT is scanning for extended advertising and has received the Advertising SID, Advertiser Address Type, and Advertiser Address.

- Test Procedure

The Upper Tester sends an HCI_LE_Periodic_Advertising_Create_Sync command to the IUT to synchronize with the Lower Tester's periodic advertisements. Options is set to 0x02 (Don't Use List, Reporting Disabled).

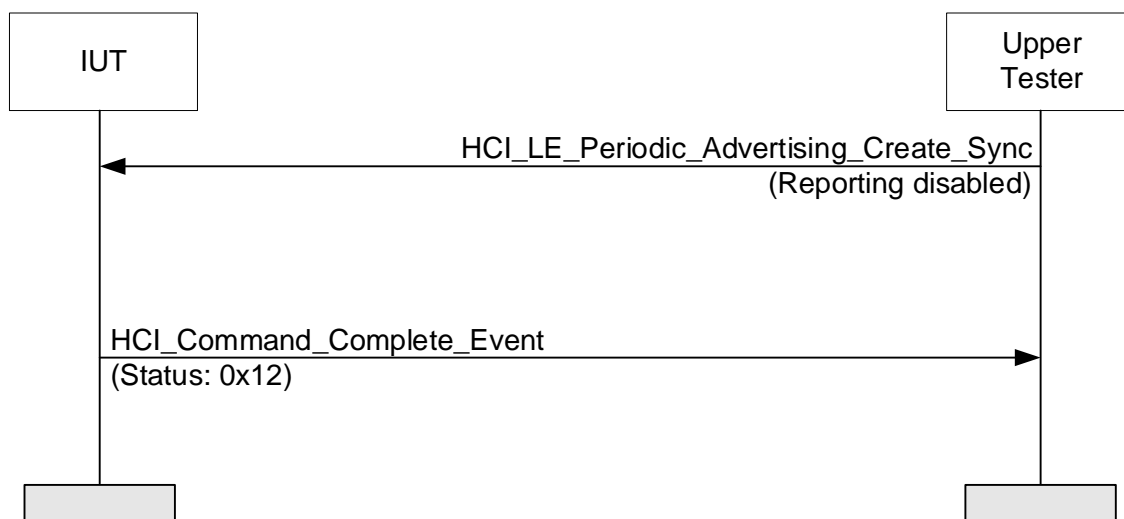


Figure 4.25: HCI/DDI/BV-03-C [Reject LE Periodic Advertising Create Sync Command With Disallowed Reporting Options]

- Expected Outcome

Pass Verdict

A Command Complete event for the HCI_LE_Periodic_Advertising_Create_Sync command is received by the Upper Tester with the Invalid HCI Command Parameters (0x12) error code.

4.6.9 HCI/DDI/BI-04-C [Reject LE Periodic Advertising Create Sync Command to a Synchronized Advertising Set]

- Test Purpose

Verify that the IUT properly rejects setting a periodic advertising that the Controller is already synchronized to, to the HCI_LE_Periodic_Advertising_Create_Sync command and returns the expected error code.

- Reference

[\[12\]](#) 7.8.67

- Initial Condition

The Lower Tester is advertising with three periodic advertisements. All three have the same Advertising Address and Advertising Address Type. The first and third periodic advertisements have the same SID while the second has a different SID.

The IUT is scanning for extended advertising and is receiving SyncInfo for all three advertisements.

- Test Procedure

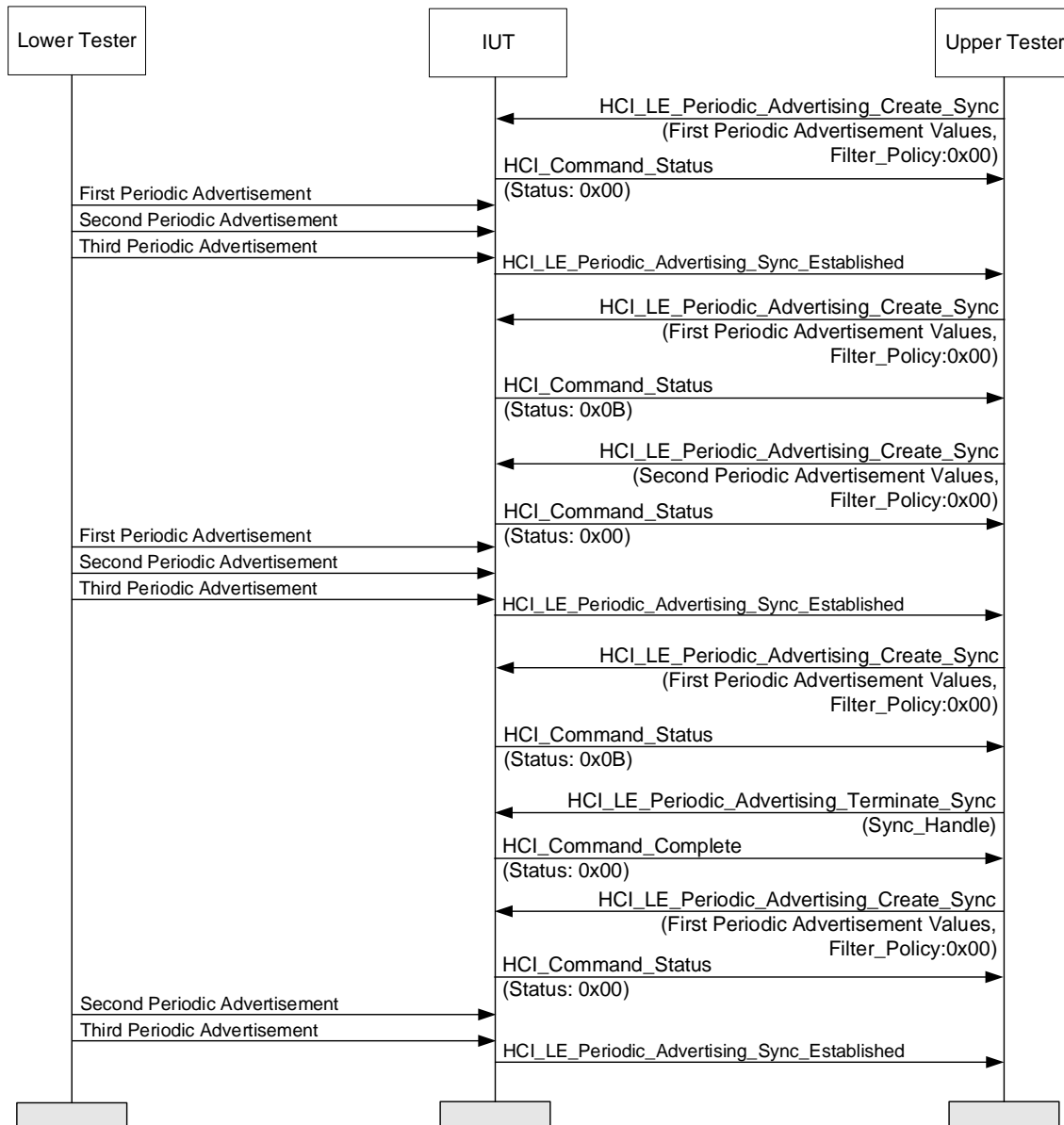


Figure 4.26: HCI/DDI/BI-04-C [Reject LE Periodic Advertising Create Sync Command to a Synchronized Advertising Set]

1. The Upper Tester sends an HCI_LE_Periodic_Advertising_Create_Sync command to the IUT to synchronize with the Lower Tester's first periodic advertisement values and with the Filter_Policy set to 0x00.
2. An HCI_Command_Status event for the HCI_LE_Periodic_Advertising_Create_Sync command is received by the Upper Tester with a Success (0x00) error code.
3. The Upper Tester waits for the HCI_LE_Periodic_Advertising_Sync_Established event.
4. The Upper Tester sends an HCI_LE_Periodic_Advertising_Create_Sync command to the IUT to synchronize with the Lower Tester's first periodic advertisement values and with the Filter_Policy set to 0x00.
5. An HCI_Command_Status event for the HCI_LE_Periodic_Advertising_Create_Sync command is received by the Upper Tester with the Connection Already Exists (0x0B) error code.

6. The Upper Tester sends an HCI_LE_Periodic_Advertising_Create_Sync command to the IUT to synchronize with the Lower Tester's second periodic advertisement values and with the Filter_Policy set to 0x00.
7. An HCI_Command_Status event for the HCI_LE_Periodic_Advertising_Create_Sync command is received by the Upper Tester with a Success (0x00) error code.
8. The Upper Tester waits for the HCI_LE_Periodic_Advertising_Sync_Established event.
9. The Lower Tester stops the first periodic advertisement while continuing the other two periodic advertisements.
10. The Upper Tester sends an HCI_LE_Periodic_Advertising_Create_Sync command to the IUT to synchronize with the Lower Tester's first periodic advertisement values and with the Filter_Policy set to 0x00.
11. An HCI_Command_Status event for the HCI_LE_Periodic_Advertising_Create_Sync command is received by the Upper Tester with the Connection Already Exists (0x0B) error code.
12. The Upper Tester sends an HCI_LE_Periodic_Advertising_Terminate_Sync command to the IUT with the Sync_Handle received in the HCI_LE_Periodic_Advertising_Sync_Established event for the First Periodic Advertisement in step 3.
13. An HCI_Command_Complete event for the HCI_LE_Periodic_Advertising_Terminate_Sync command is received by the Upper Tester with a Success (0x00) error code.
14. The Upper Tester sends an HCI_LE_Periodic_Advertising_Create_Sync command to the IUT to synchronize with the Lower Tester's first periodic advertisement values and with the Filter_Policy set to 0x00.
15. A HCI_Command_Status event for the HCI_LE_Periodic_Advertising_Create_Sync command is received by the Upper Tester with a Success (0x00) error code.
16. The Upper Tester waits for the HCI_LE_Periodic_Advertising_Sync_Established event.

- Expected Outcome

Pass Verdict

The Upper Tester receives an HCI_Command_Status event with the expected status for each command.

The Upper Tester receives HCI_LE_Periodic_Advertising_Sync_Established events as expected for each HCI_LE_Periodic_Advertising_Create_Sync command that returned a status of success.

4.6.10 HCI/DDI/BI-05-C [LE Set Extended Scan Parameters With Unsupported PHY]

- Test Purpose

Verify that the IUT properly rejects an HCI_LE_Set_Extended_Scan_Parameters command that specifies unsupported PHYs.

- Reference

[9] 7.8.64

- Initial Conditions

IUT is not currently scanning.



- Test Procedure

For each bit on the Scanning_PHYs parameter of the HCI_LE_Set_Extended_Scan_Parameters command that is an RFU bit or corresponds to a PHY not supported by the IUT:

Upper Tester sends an HCI_LE_Set_Extended_Scan_Parameters command to IUT with Scanning_PHYs having only that bit set and expects an HCI_Command_Complete event with a non-zero status.

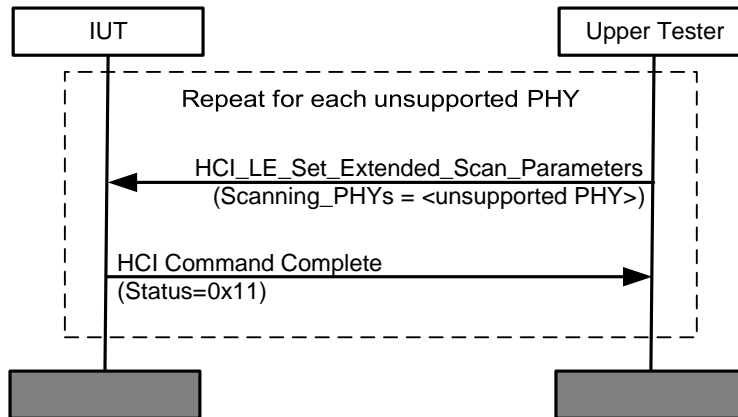


Figure 4.27: HCI/DDI/BI-05-C [LE Set Extended Scan Parameters With Unsupported PHY]

- Expected Outcome

If the IUT supports PHYs corresponding to all 8 bits of the Scanning_PHYs parameter, the test procedure will do nothing. This case is a Pass.

Pass Verdict

For each unsupported PHY (if applicable), a Command Complete event for HCI_LE_Set_Advertising_Parameters is received by the Upper Tester with the error Code Unsupported Feature or Parameter Value (0x11).

4.6.11 Reject Invalid Enable Command

- Test Purpose

Verify that the IUT properly rejects an enable command when the LE Random Device Address is unset, and returns the expected error code.

- Initial Condition

IUT is in standby.

IUT has not set its LE Random Device Address.

- Test Procedure

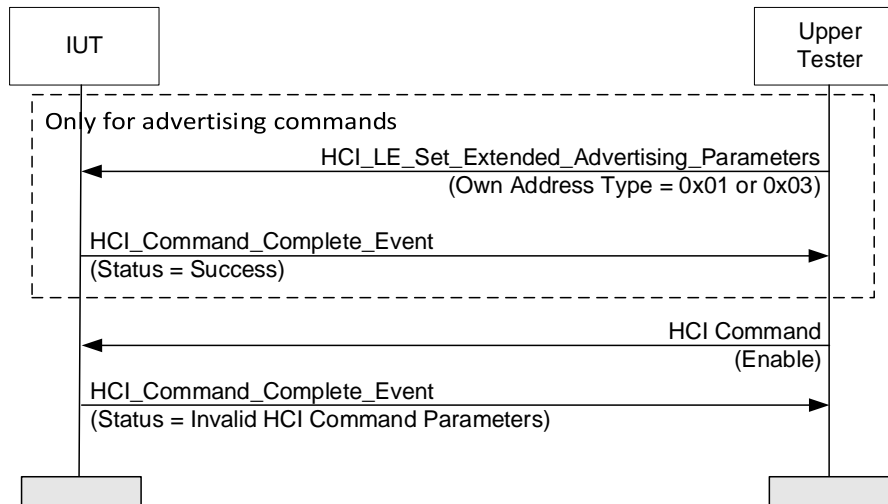


Figure 4.28: Reject Invalid Enable Command

- Upper Tester sets the Own_Address_Type using the command and parameter in the “HCI Set Command and Parameter” column in [Table 4.6](#). Set all other fields to valid values.
- The IUT returns an HCI_Command_Complete event with Success (0x00).
- Upper Test sends the HCI Command under test from [Table 4.6](#) with the “Enable Parameter” set to 0x1 and with any other parameters set to valid values.
- The IUT returns an HCI_Command_Complete event with the error code Invalid HCI Command Parameters (0x12).

Test Case	HCI Set Command and Parameter	HCI Command and Parameter
HCI/DDI/BI-06-C [9] 7.8.9	HCI_LE_Set_Advertising_Parameters (0x03)	HCI_LE_Set_Advertising_Enable (Advertising_Enable)
HCI/DDI/BI-07-C [9] 7.8.11	HCI_LE_Set_Scan_Parameters (0x03)	HCI_LE_Set_Scan_Enable (LE_Scan_Enable)
HCI/DDI/BI-08-C [9] 7.8.56	HCI_LE_Set_Extended_Advertising_Parameters (0x01)	HCI_LE_Set_Extended_Advertising_Enable (Enable)
HCI/DDI/BI-09-C [9] 7.8.56	HCI_LE_Set_Extended_Advertising_Parameters (0x03)	HCI_LE_Set_Extended_Advertising_Enable (Enable)
HCI/DDI/BI-11-C [9] 7.8.65	HCI_LE_Set_Extended_Scan_Parameters (0x01 or 0x03)	HCI_LE_Set_Extended_Scan_Enable (Enable)

Table 4.6: Test Cases

- Expected Outcome

Pass Verdict

The IUT generates a Command Complete event for the HCI command under test with a status of Invalid HCI Command Parameters (0x12).

4.6.12 HCI/DDI/BI-12-C [Reject Invalid Extended Advertising Enable Command]

- Test Purpose

Verify that the IUT properly rejects an HCI_LE_Set_Extended_Advertising_Enable command when the IUT is not properly configured, and returns the expected error code.

- Reference

[9] 7.8.56

- Initial Condition

IUT is in standby.

Extended advertising parameters with the scannable property set have been configured on the IUT for a particular advertising handle, but no scan response data has been set for that handle.

- Test Procedure

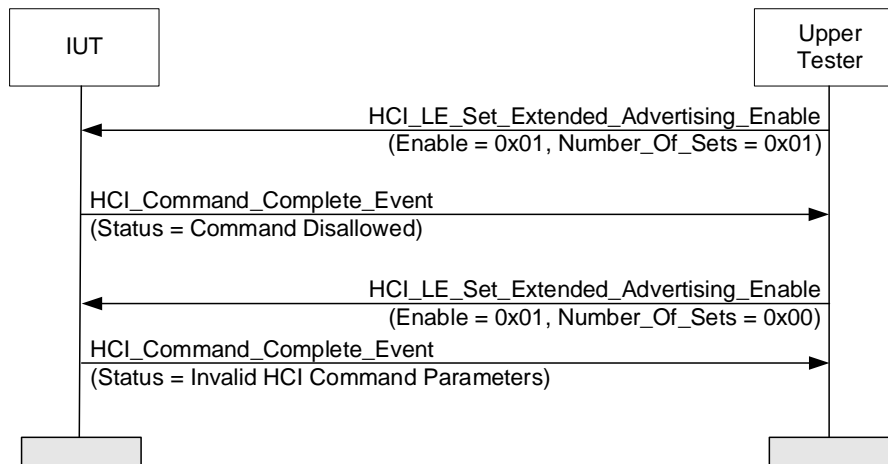


Figure 4.29: Reject Invalid Enable Command

- Upper Tester sends the HCI_LE_Set_Extended_Advertising_Enable command with the Enable parameter set to 0x01, the Advertising_Handle set to existing Advertising_Handle, Number_Of_Sets set to 0x01, and with all other parameters set to valid values.
- The IUT returns an HCI_Command_Complete event with the error code Command Disallowed (0x0C).
- Upper Tester sends the HCI_LE_Set_Extended_Advertising_Enable command with the Enable parameter set to 0x01, the Advertising_Handle set to existing Advertising_Handle, Number_Of_Sets set to 0x00, and with all other parameters set to valid values.
- The IUT returns an HCI_Command_Complete event with the error code Invalid HCI Command Parameters (0x12).

- Expected Outcome

Pass Verdict

The IUT generates a Command Complete event for each HCI_LE_Set_Extended_Advertising_Enable command with the expected error code.

4.6.13 HCI/DDI/BI-13-C [Reject Invalid Periodic Advertising Enable Command]

- Test Purpose

Verify that the IUT properly rejects an HCI_LE_Set_Periodic_Advertising_Enable command when the IUT is not properly setup, and returns the expected error code.

- Reference

[9] 7.8.63

- Initial Condition

IUT is in standby.

Extended advertising parameters and periodic advertising parameters have been configured on the IUT for a particular advertising handle, but no periodic advertising data has been set for that handle.

- Test Procedure

1. Upper Test sends the HCI_LE_Set_Periodic_Advertising_Enable with the Enable parameter set to 0x01, the Advertising_Handle set to the existing Advertising_Handle.
2. The IUT returns an HCI_Command_Complete event with the error code Command Disallowed (0x0C).

- Expected Outcome

Pass Verdict

The IUT generates a Command Complete event for the HCI_LE_Set_Periodic_Advertising_Enable command with the expected error code.

4.7 Host Flow Control

Test group objectives:

To verify the correct implementation of the Host flow control commands.

4.7.1 HCI/HFC/BV-01-C [Set_Event_Mask Command]

- Test Purpose

Verify that the *Set_Event_Mask* command controls which events are generated by the IUT.

- Reference

[1] 7.3.1

- Initial Condition
IUT must be configured as master.

The IUT is in STANDBY mode.

- Test Procedure

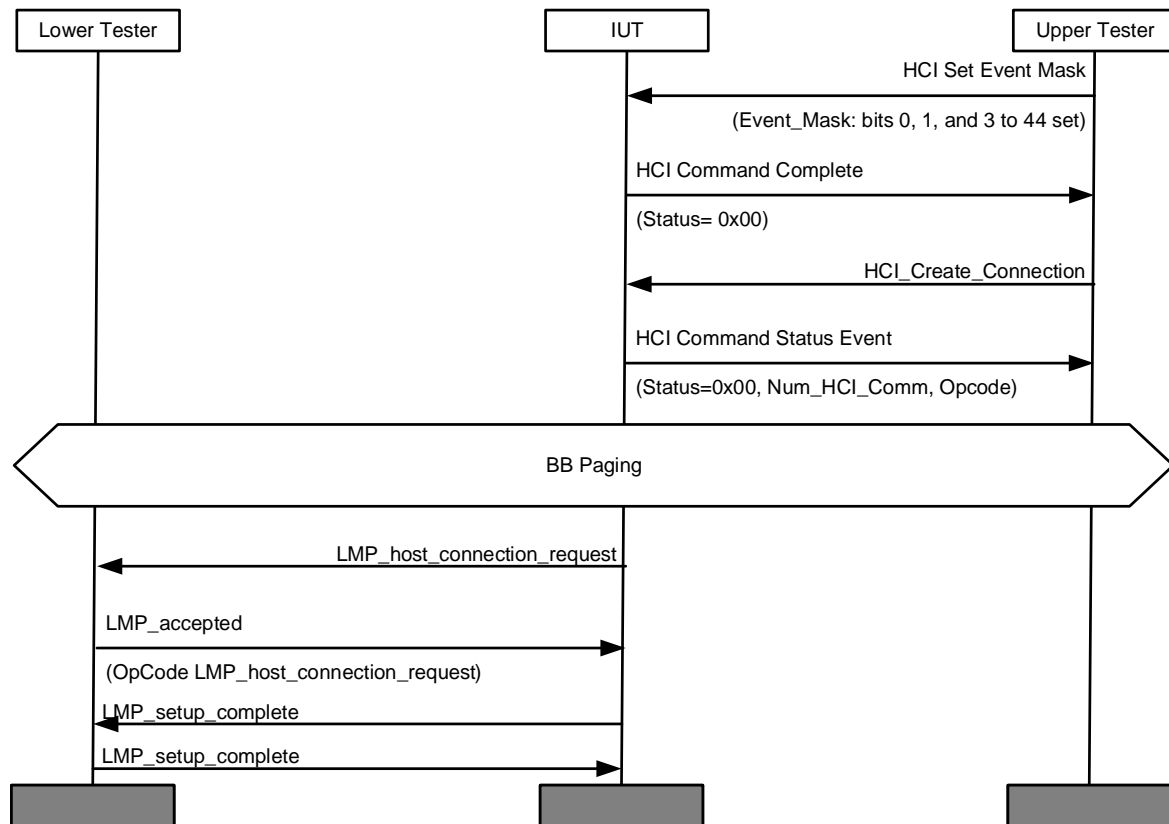


Figure 4.30: HCI/HFC/BV-01-C Set_Event_Mask

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the Set_Event_Mask command.

The IUT does not return a 'Connection Complete' event.

4.7.2 HCI/HFC/BV-02-C [Set_Event_Filter Command]

- Test Purpose

Verify that the Set_Event_Filter command controls which events are generated using filters.

- Reference

[1] 7.3.3

- Initial Condition
IUT must be configured as slave.
The IUT is in STANDBY mode.

- Test Procedure

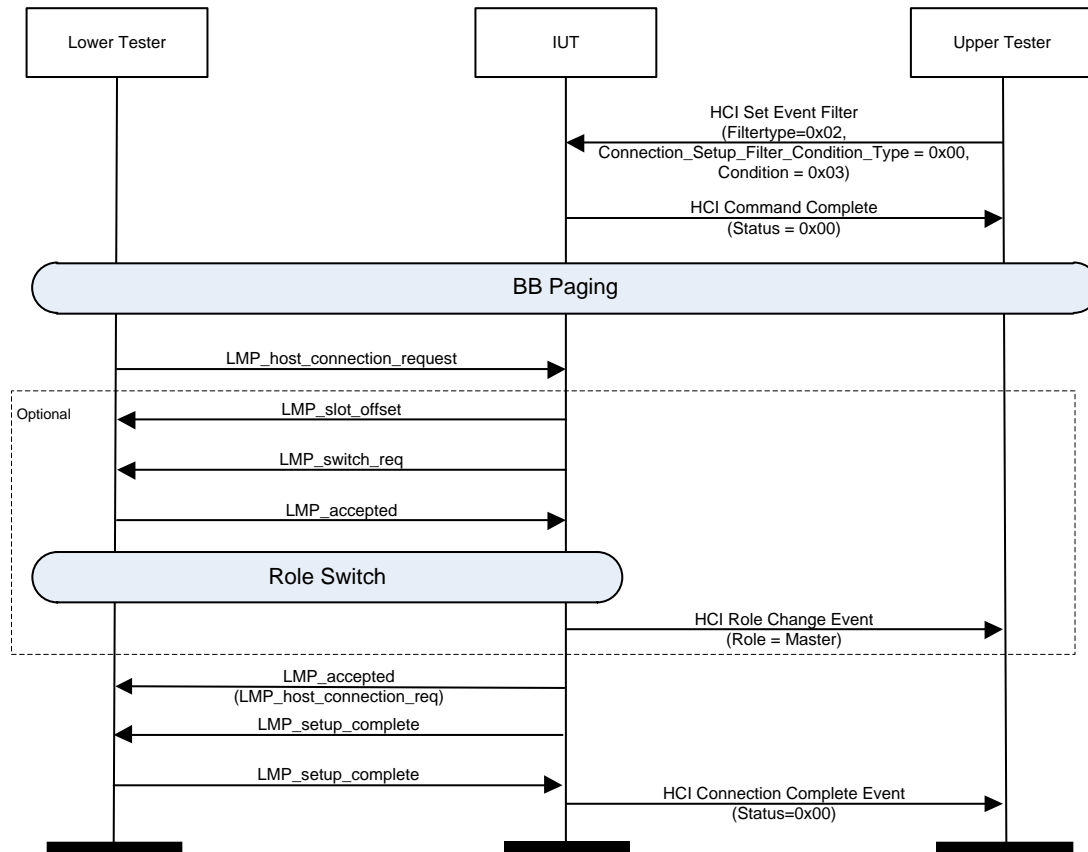


Figure 4.31: HCI/HFC/BV-02-C `Set_Event_Filter`

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the `Set_Event_Filter` command.

The IUT does not return a 'Connection Request' event.

The IUT returns a 'Role Change' event with role as Master if Role Switch is supported.

The IUT does return a 'Connection Complete' event.

4.7.3 HCI/HFC/BV-03-C [`Set_Event_Mask_2` Command]

- Test Purpose

Verify that the `Set Event Mask 2` command controls which events are generated by the IUT.

- [1] 7.3.69

- ## Test Procedure

Upper Tester issues a Create Physical Link command.

The Physical Link is successfully created.



- Pass Verdict

The IUT returns 'command complete' succeeded to the Set_Event_Mask command.

4.7.4 HCI/HFC/BV-04-C [LE Set Event Mask]

- Test Purpose

Verify that the LE Set Event Mask command controls which events are generated by the IUT.

- Reference

[1] 7.3.1, 7.8.1

- Initial Condition

No LL connection exists.

- Test Procedure

Upper Tester sends HCI LE Set Event Mask to mask HCI LE Advertising Report Event.

IUT is configured as active scanner and Lower Tester starts advertising.

Upper Tester expects no HCI LE Advertising Report Event.

Upper Tester disables scanning on IUT.

Upper Tester sends HCI_LE_Create_Connection to IUT and expects HCI_LE_Connection_Complete event from IUT.

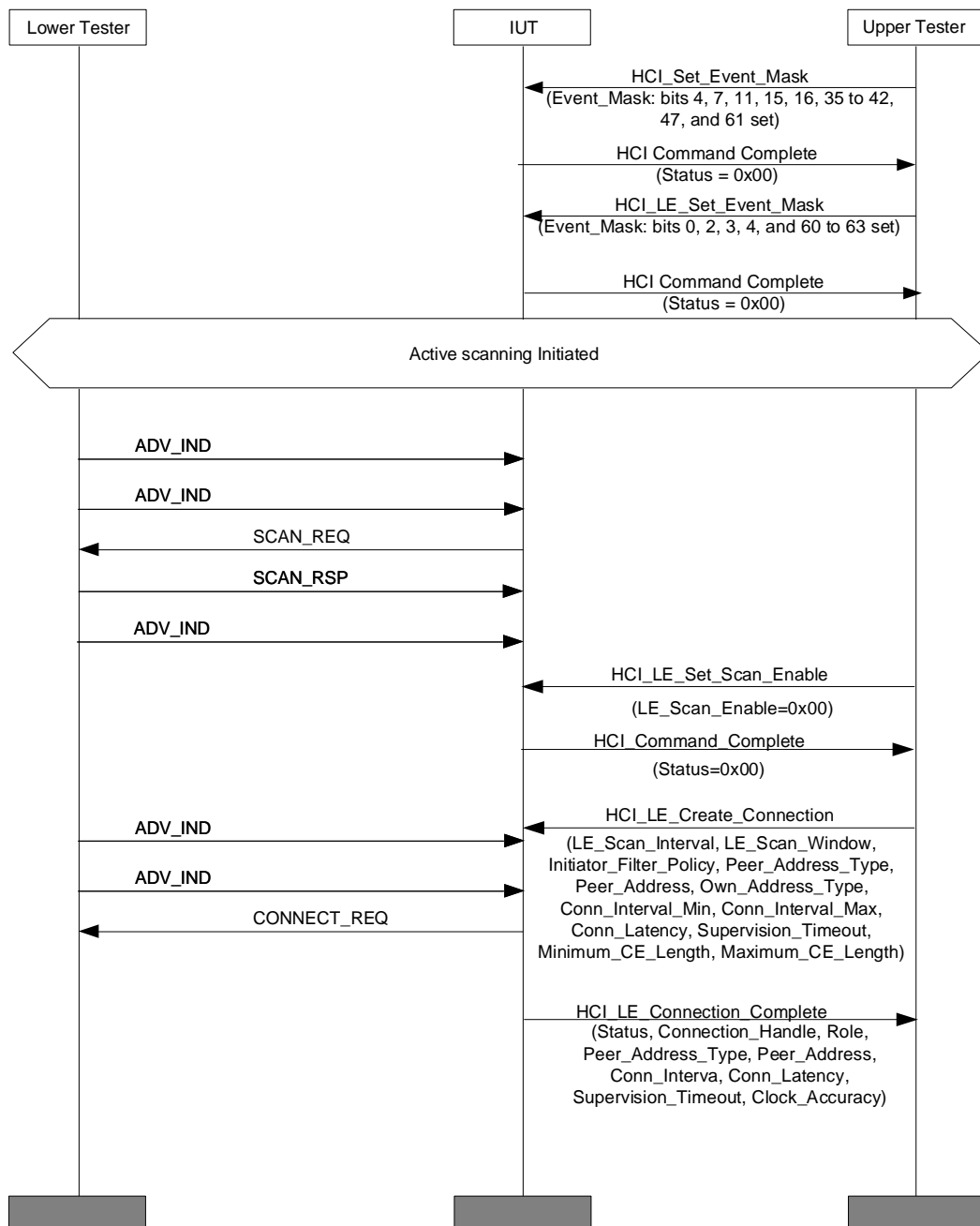


Figure 4.33: HCI/HFC/BV-04-C LE set event mask

- Expected Outcome

Pass Verdict

The IUT returns HCI Command Complete Event with Status = Success.

IUT does not send HCI LE Advertising Report Event.

IUT sends HCI LE Connection Complete event after receiving HCI LE Create Connection.

4.7.5 HCI/HFC/BV-05-C [Set_Event_Filter Command to perform auto accept connection from configured and specified bd address over ACL]

- Test Purpose

Verify that the Set_Event_Filter command can perform auto accept connection from configured and specified bd address.

- Reference

[1] 7.3.3

- Initial Condition

IUT configured as slave.

The IUT is in STANDBY mode.

BD address of the Lower Tester is set in HCI Set Event Filter.

- Test Procedure

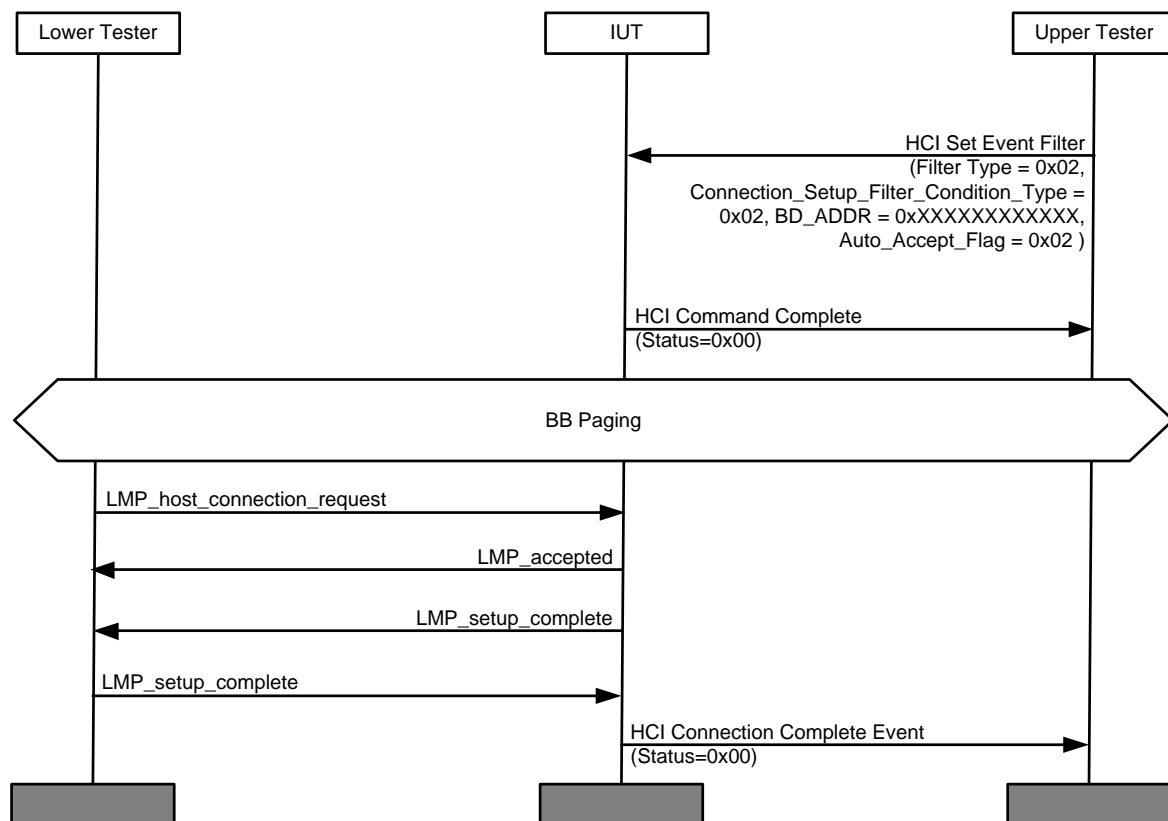


Figure 4.34: HCI/HFC/BV-05-C Set Event Filter Command to perform auto accept connection from configured and specified bd address

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the Set_Event_Filter command.

The IUT does not return a 'Connection Request' event.

The IUT does not perform role switch.

The IUT does return a 'Connection Complete' event.

4.7.6 HCI/HFC/BV-06-C [Set_Event_Filter Command, connection request rejection]

- Test Purpose

Verify that the Set_Event_Filter command leads to connection request rejection from peer device which is not specified for auto accept in the filter condition.

- Reference

[1] 7.3.3

- Initial Condition

IUT configured as slave.

The IUT is in STANDBY mode.

BD address of the Lower Tester is **NOT** set in HCI Set Event Filter.

- Test Procedure

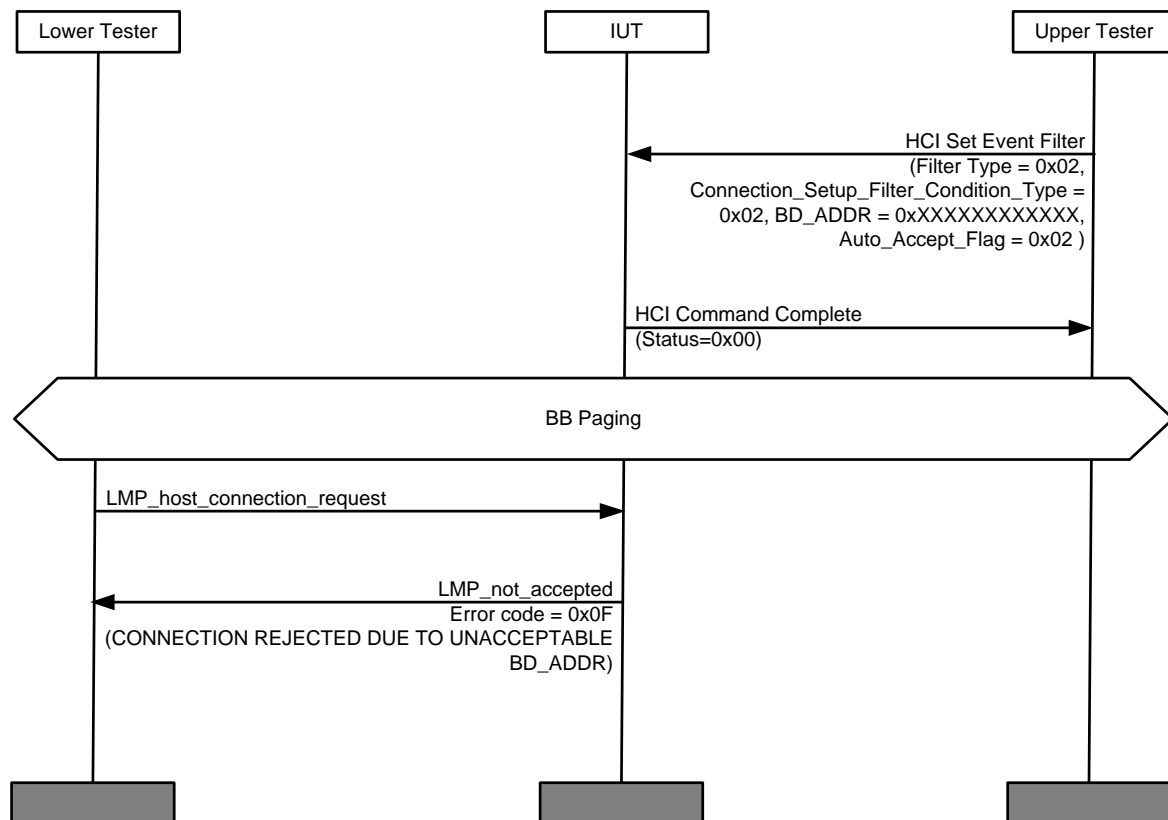


Figure 4.35: HCI/HFC/BV-06-C Set Event Filter Command, connection request rejection

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the *Set_Event_Filter* command.

The IUT does not return a 'Connection Request' event.

The IUT does not perform role switch.

The IUT does not return a 'Connection Complete' event.

4.7.7 HCI/HFC/BV-07-C [Set_Event_Filter Command, Host configures the Controller to Allow Connections, specifying a Class of Device and a Class of Device Mask]

- Test Purpose

Verify that the *Set_Event_Filter* command controls which events are generated using filters.

In this test Host configure the Controller to Allow Connections from the Lower Tester, specifying a Class of Device and a Class of Device Mask. For this condition, the Auto Accept Flag is set to Do auto accept the connection with role switch disabled.

Test that Host will receive a Connection Complete event from the Lower Tester only when a connection request matches one of the filters set by the Host.

- Reference

[1] 7.3.3

- Initial Condition

IUT must be configured as slave.

The IUT is in STANDBY mode.

Class of Device of the Lower Tester is set in HCI Set Event Filter.

Class of Device Mask is set to 0xFFFFFFFF in HCI Set Event Filter.

Auto Accept Flag is set to Do Auto accept the connection.

- Test Procedure

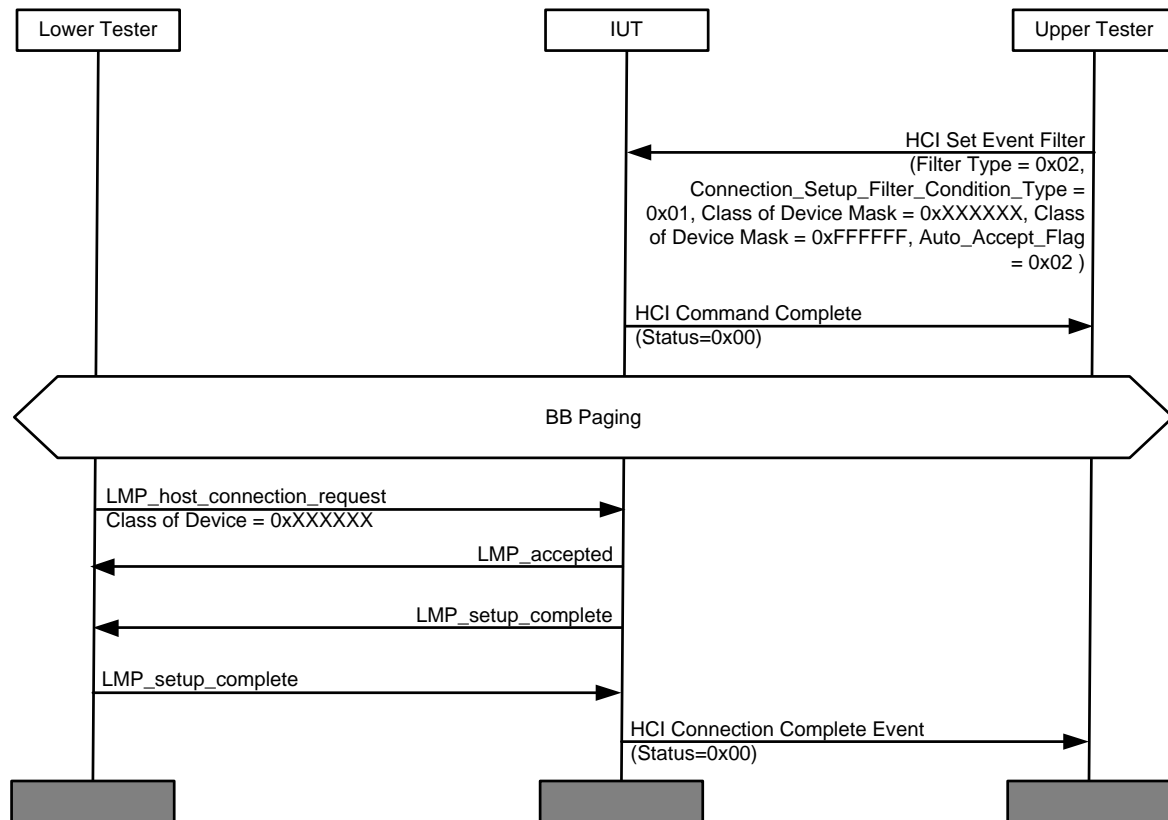


Figure 4.36: HCI/HFC/BV-07-C Set Event Filter Command, Host configures the Controller to Allow Connections, specifying a Class of Device and a Class of Device Mask

- Expected Outcome

Pass Verdict

The IUT returns 'Command Complete' (Status = 0x00) (Success) to the *Set_Event_Filter* command.

The IUT will accept the connection request when the condition is met and the auto accept flag was set for that condition. The IUT will send the 'Connection Complete' (Status=0x00) (Success) event to the Host.

4.7.8 HCI/HFC/BV-08-C [Set_Event_Filter Command to controls which events are generated using filters]

- Test Purpose

Verify that the *Set_Event_Filter* command controls which events are generated using filters.

In this test, the Host configure the Controller to Allow Connections from a device with a specific BD_ADDR, specifying the BD_ADDR of the Lower Tester. For this connection setup filter condition, the Auto_Accept_Flag is set to Do NOT auto accept the connection.

Test that the Host will receive a Connection Request event from the Lower Tester and will not auto accept the connection, and the Upper Tester verifies the behavior of the IUT for a successful connection and also an unsuccessful connection scenario.

- Reference

[1] 7.3.3

- Initial Condition

IUT must be configured as slave.

The IUT is in STANDBY mode.

BD address of the Lower Tester is set in HCI Set Event Filter.

Auto Accept Flag is set to Do NOT Auto accept the connection.

Connection Setup Filter Condition is set to Allow Connections from a device with a specific BD_ADDR.

- Test Procedure

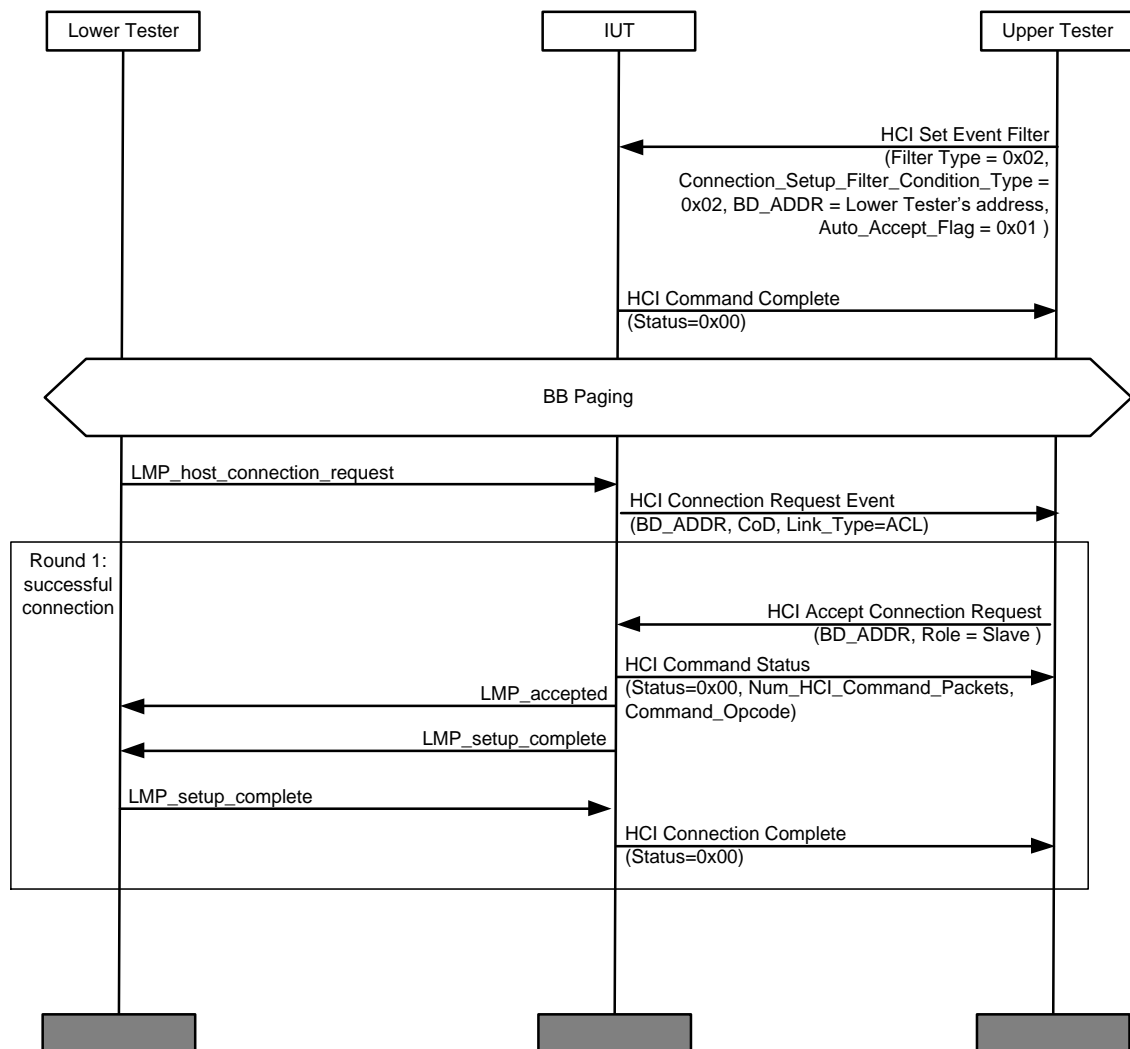


Figure 4.37: HCI/HFC/BV-08-C Set Event Filter Command to controls which events are generated using filters, MSC 1

MSC 1: Host receives a connection request from the Lower Tester and connection is successful.

Reset the device before the next round.

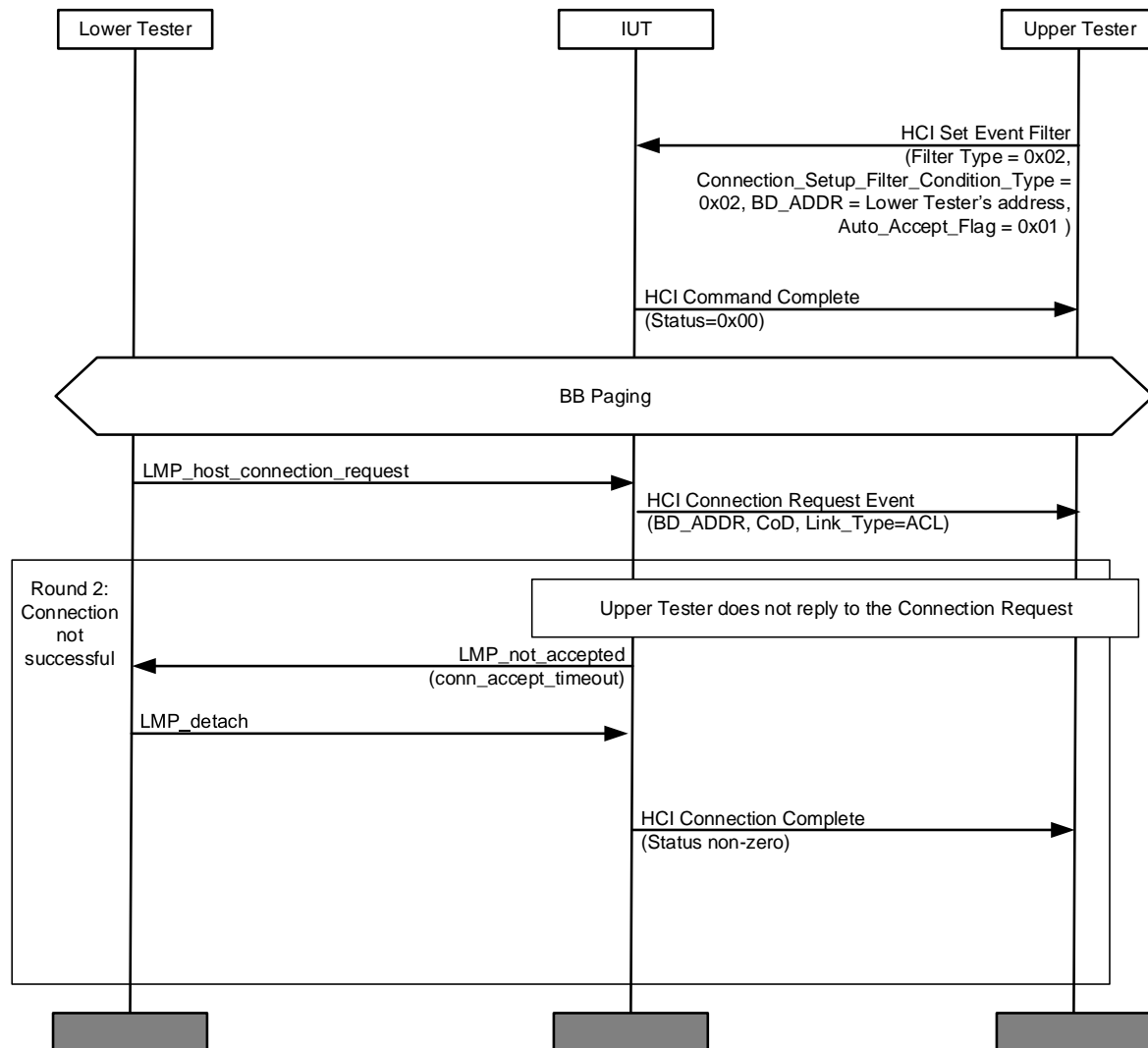


Figure 4.38: HCI/HFC/BV-08-C Set Event Filter Command to controls which events are generated using filters, MSC 2

MSC 2: Host receives a connection request from the Lower Tester and Upper Tester does not reply.

- Expected Outcome

Pass Verdict

In the first round:

- The IUT returns 'command complete' success to the *Set_Event_Filter* command from the Upper Tester.
- The IUT sends the 'Connection Request' event to the Upper Tester.
- After the Upper Tester accepts the connection, the connection with the IUT and Lower Tester is successfully established.

In the second round:

- The IUT returns 'command complete' success to the *Set_Event_Filter* command from the Upper Tester.
- The IUT sends the 'Connection Request' event to the Upper Tester.
- After the Upper Tester does not answer the connection request, the IUT sends an LMP_not_accepted PDU with non-zero status to the Lower Tester.

4.7.9 [Set_Event_Filter Command to perform auto accept synchronous connection from configured and specified bd address]

- Test Purpose

Verify that the Set_Event_Filter command can perform auto accept connection from a configured and specified BD address over an SCO Type connection as specified in [Table 4.7](#).

- Reference

[1] 7.3.3

- Initial Condition

IUT configured as slave.

See Section [4.1.3](#).

BD address of the Lower Tester is set in HCI Set Event Filter.

- Test Procedure

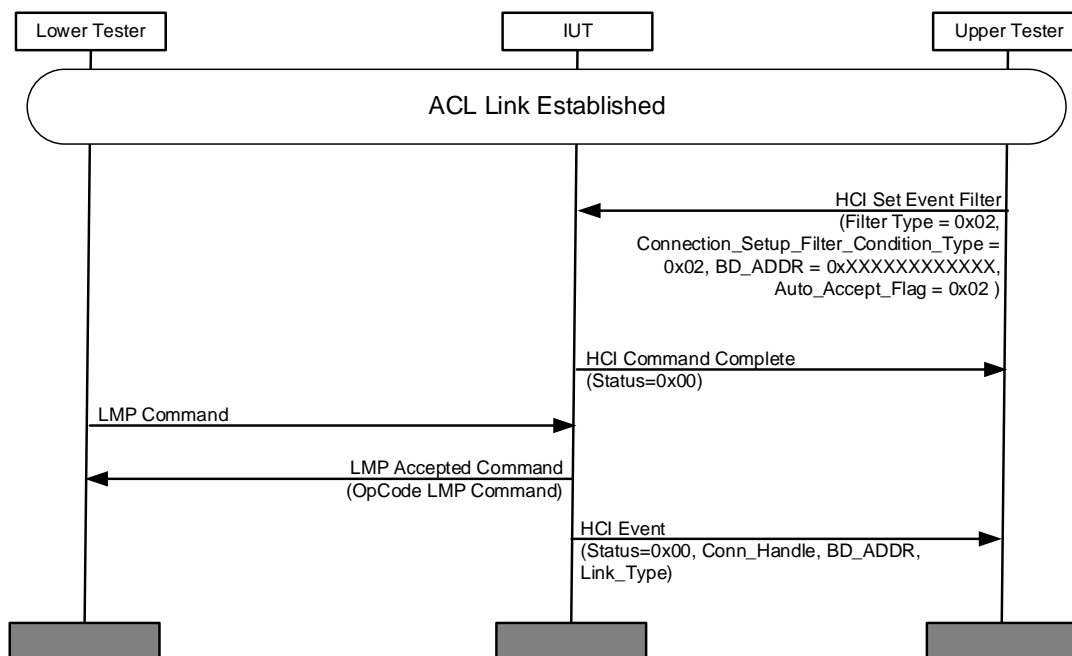


Figure 4.39: Set Event Filter Command to perform auto accept connection from configured and specified bd address

- Test Case Configuration

Test Case ID	SCO Type	LMP Command	LMP Accepted Command	HCI Event
HCI/HFC/BV-09-C	SCO	LMP_SCO_link_req	LMP_accepted	HCI Connection Complete Event
HCI/HFC/BV-10-C	eSCO	LMP_eSCO_link_req	LMP_accepted_ext	HCI Synchronous Connection Complete Event

Table 4.7: Set Event Filter Command to perform auto accept connection from configured and specified bd address test cases

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the Set_Event_Filter command.

The IUT does not return a 'Connection Request' event.

The IUT does return a '(Synchronous) Connection Complete' event.

[4.7.10 HCI/HFC/BV-11-C \[Auto Accept Off, Event Masked, connection request rejection over ACL\]](#)

- Test Purpose

Verify that the Set_Event_Filter command leads to connection request rejection from peer device when the HCI_Connection_Request event is masked.

- Reference

[\[1\]](#) 7.3.3

- Initial Condition

IUT configured as slave.

The IUT is in STANDBY mode.

The IUT has masked out the Connection Request Event (3) bit.

- Test Procedure

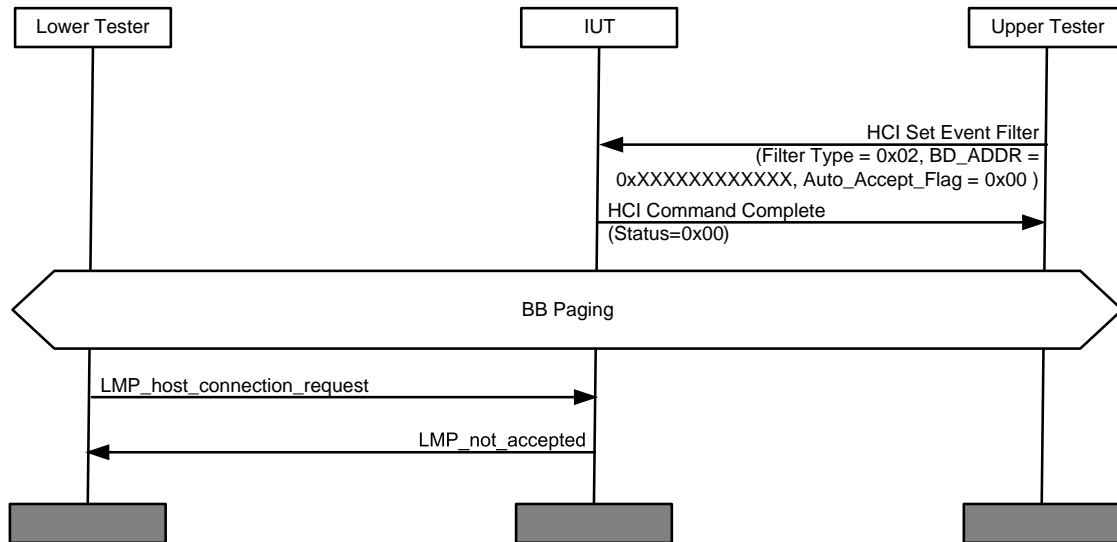


Figure 4.40: Auto Accept Off, Event Masked, connection request rejection over ACL

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the *Set_Event_Filter* command.

The IUT does not return a 'Connection Request' event.

The IUT rejects the connection to the LT.

4.7.11 [Auto Accept Off, Event Masked, connection request rejection over SCO Type]

- Test Purpose

Verify that the *Set_Event_Filter* command leads to connection request rejection from peer device when the *HCI_Connection_Request* event is masked for a SCO Type connection as specified in [Table 4.8](#).

- Reference

[1] 7.3.3

- Initial Condition

IUT configured as slave.

See Section [4.1.3](#).

The IUT has masked out the Connection Request Event (3) bit.

- Test Procedure
 1. The Upper Tester calls HCI_Set_Event_Filter with Auto_Accept_Flag=0x0 , and address of the LT, and valid values for all other parameters.
 2. The Lower Tester initiates a connection to the IUT.
 3. The IUT will reject the connection.

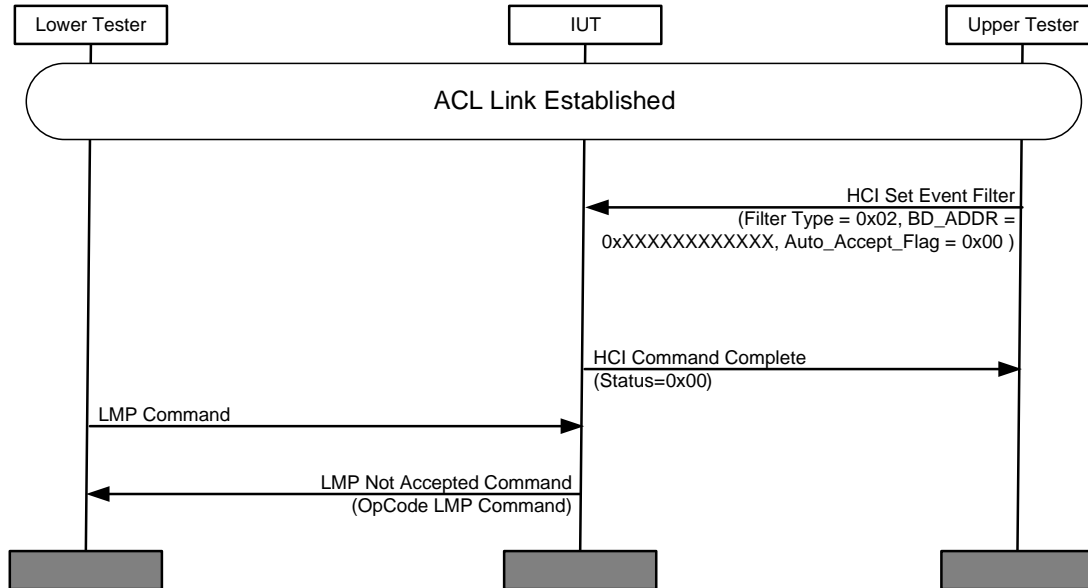


Figure 4.41: Auto Accept Off, Event Masked, connection request rejection over SCO Type

- Test Case Configuration

Test Case ID	SCO Type	LMP Command	LMP Not Accepted Command
HCI/HFC/BV-12-C	SCO	LMP_SCO_link_req	LMP_not_accepted
HCI/HFC/BV-13-C	eSCO	LMP_eSCO_link_req	LMP_not_accepted_ext

Table 4.8: Auto Accept Off, Event Masked, connection request rejection over SCO Type test cases

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the *Set_Event_Filter* command.

The IUT does not return a 'Connection Request' event.

The IUT rejects the connection to the LT.

4.8 Authentication and Encryption

Test group objectives:

To verify the correct implementation of the Host flow control commands

4.8.1 HCI/AEN/BV-01-C [Link Key Commands]

- Test Purpose

Verify that the Write Stored Link Key, Read Stored Link Key and Delete Stored Link Key commands write, read and delete stored link keys.

- Reference

[\[1\]](#) 7.3.8, 7.3.9, 7.3.10

- Initial Condition

No LL connection exists.

- Test Procedure

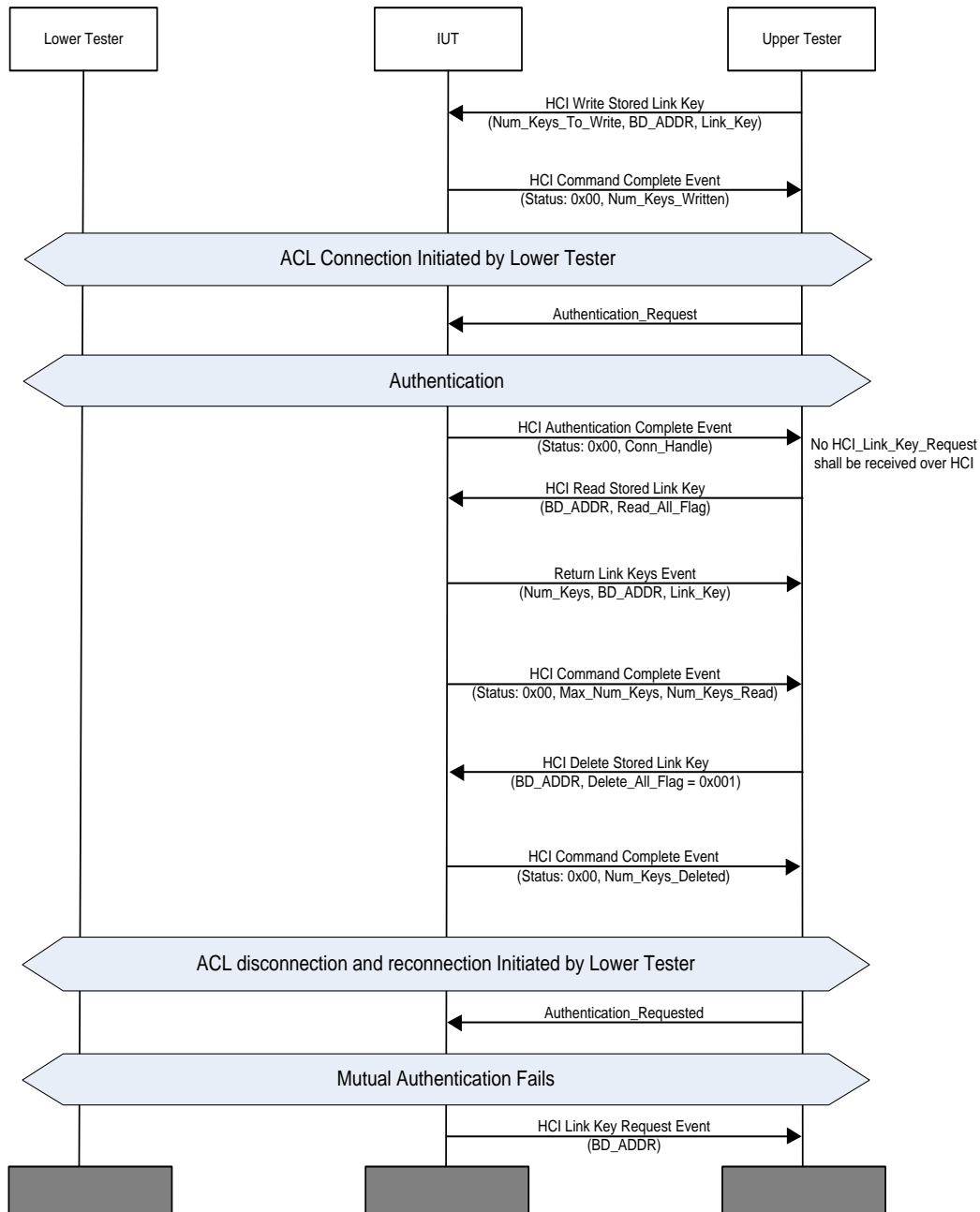


Figure 4.42: HCI/AEN/BV-01-C Link Key Commands

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the Write Stored Link Key command. The IUT returns 'command complete' succeeded to the Read Stored Link Key command and returns the expected stored link key.

The authentication using the stored link key succeeds as indicated by an 'Authentication Complete' event.

The IUT returns 'command complete' succeeded to the Delete Stored Link Key command.

The final authentication request results in a returned 'Link key Request' event.

- Note

This test case is applicable only to IUT that support the Bluetooth Core Specification version 2.0 or earlier.

4.8.2 HCI/AEN/BV-02-C [Reading All Link Keys]

- Test Purpose

Verify that the IUT can have its link keys read, without revealing the values of the link keys stored in the controller.

- Reference

[1] 7.3.8

- Initial Condition

The IUT is connected via HCI and has a minimum of one stored link key.

- Test Procedure

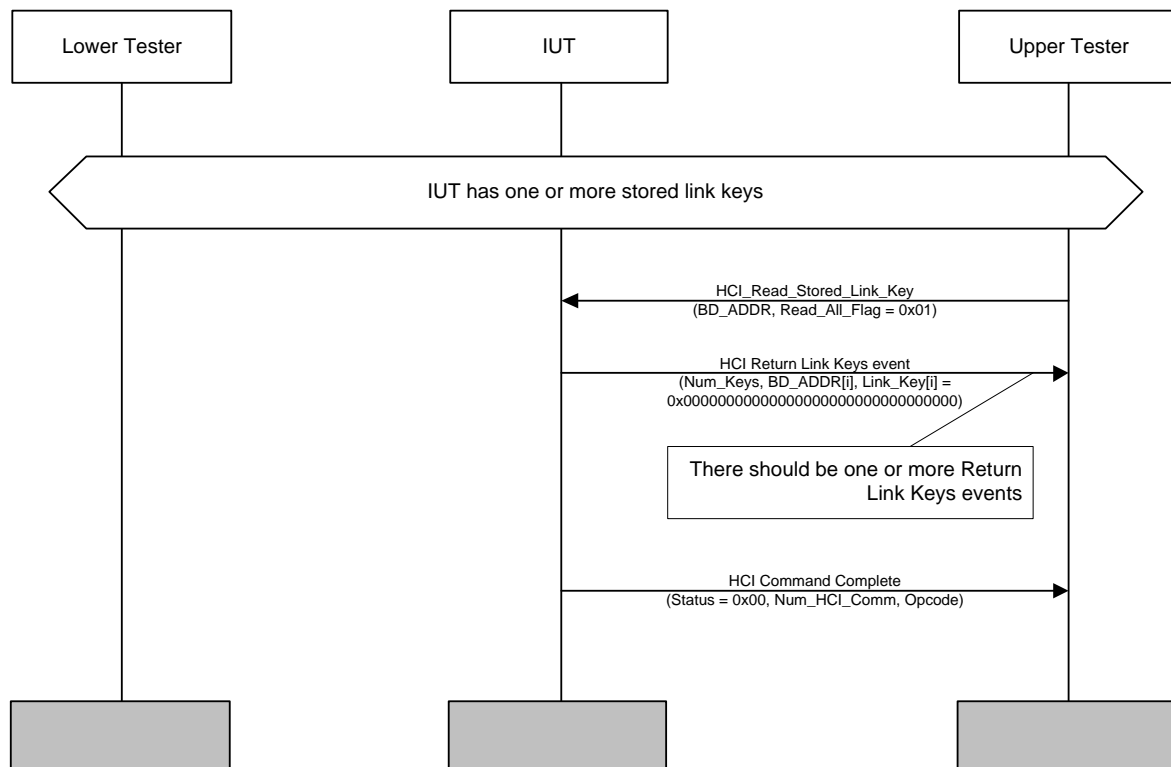


Figure 4.43: HCI/AEN/BV-02-C (Reading Link Keys)

The Upper Tester issues a Read Stored Link Keys with Read_All_Flag.

The IUT returns a Return Link Keys event.

- Expected Outcome

Pass Verdict

The link key values in the Return Link Keys event are zero.

4.8.3 HCI/AEN/BV-03-C [Reading Single Link Key]

- Test Purpose

Verify that the IUT can have a link key read, without revealing the value of the link keys stored in the controller.

- Reference

[1] 7.3.8

- Initial Condition

The IUT is connected via HCI and has a minimum of one stored link key.

- Test Procedure

The Upper Tester issues a Read Stored Link Keys for a single *BD_ADDR*.

The IUT returns a Return Link Keys event.

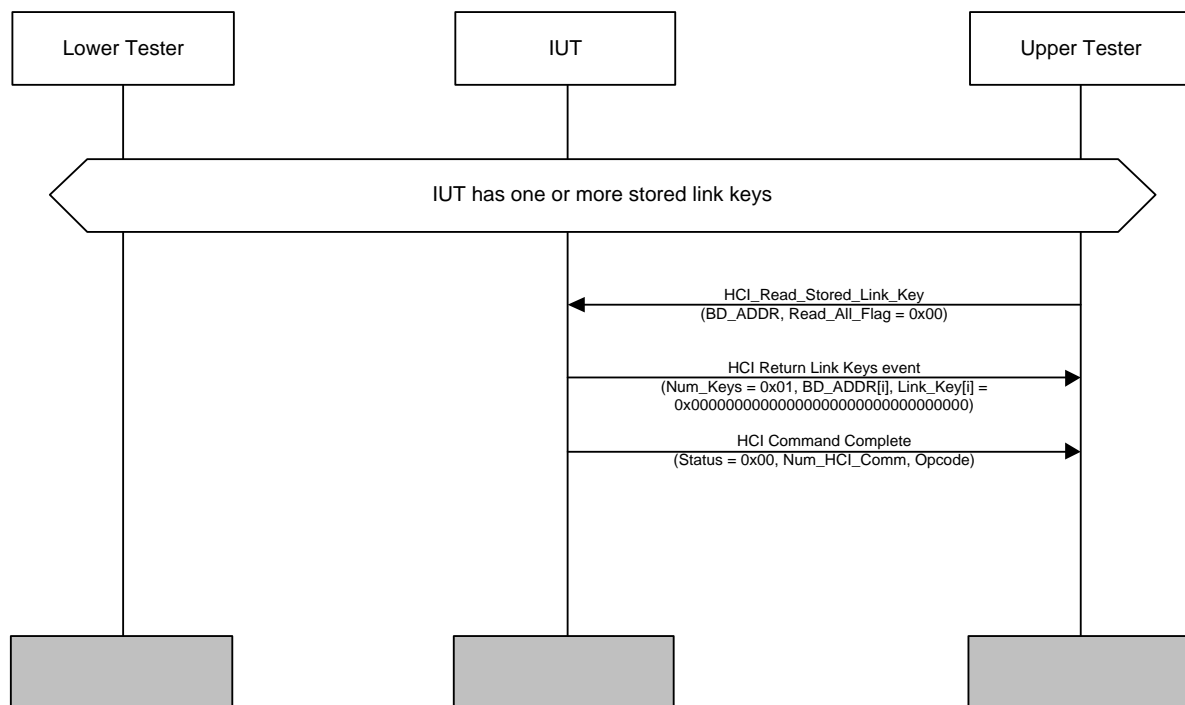


Figure 4.44: HCI/AEN/BV-03-C: (Reading Link Keys)

- Expected Outcome

Pass Verdict

The link key values in the Return Link Keys event are zero.

4.8.4 HCI/AEN/BV-04-C [Link Key Commands – IUT Returns All Zero Link Key]

- Test Purpose

Verify that the Write Stored Link Key, Read Stored Link Key and Delete Stored Link Key commands write, read and delete stored link keys and the Return Link Keys Event does not return the value of the link keys.

- Reference

[1] 7.3.8, 7.3.9, 7.3.10

- Initial Condition

No LL connection exists.

- Test Procedure

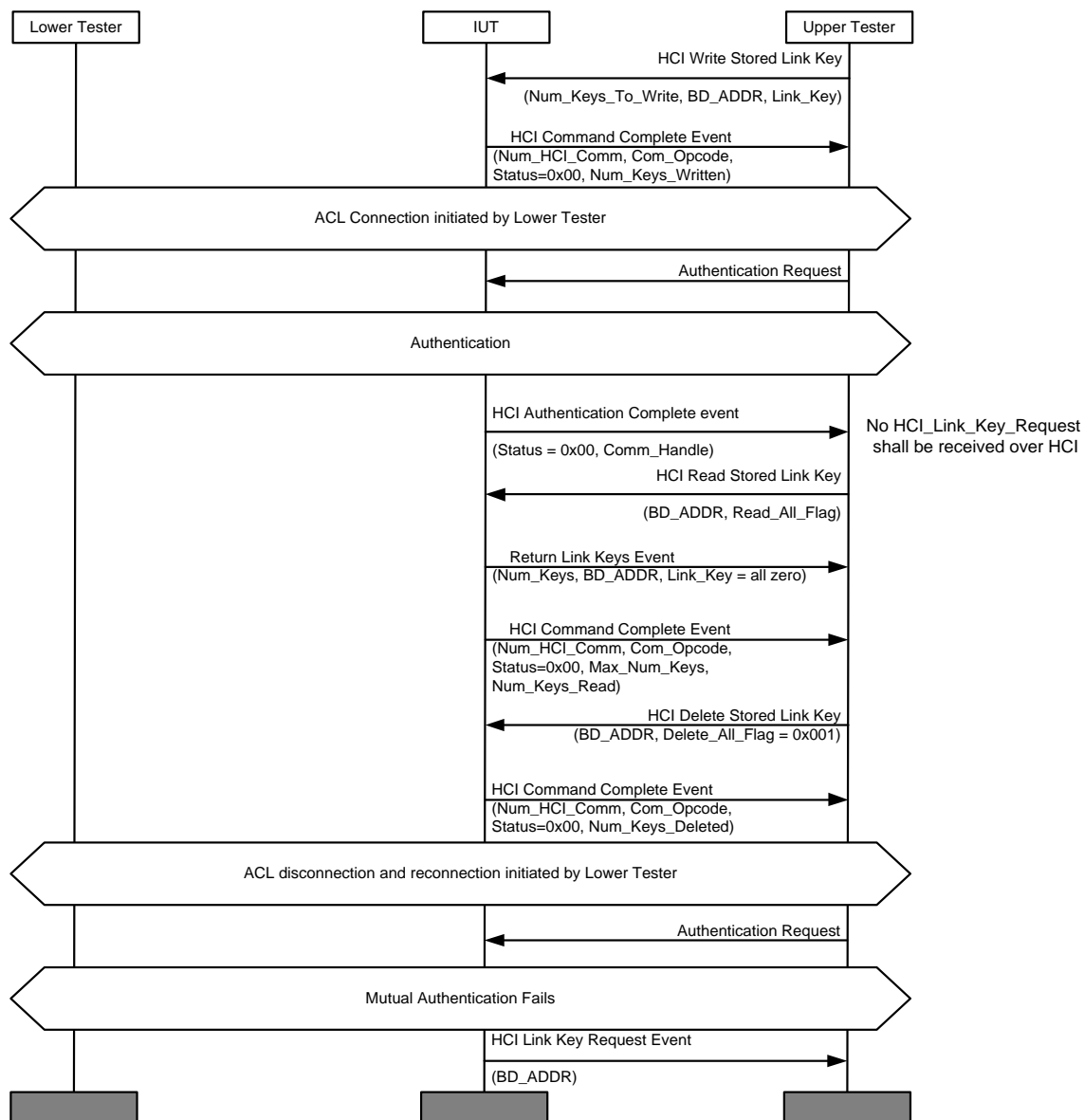


Figure 4.45: HCI/AEN/BV-04-C Link Key Commands – IUT Returns All Zero Link Key

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the Write Stored Link Key command. The IUT returns 'command complete' succeeded to the Read Stored Link Key command and returns the all zero link key.

The authentication using the stored link key succeeds as indicated by an 'Authentication Complete' event.

The IUT returns 'command complete' succeeded to the Delete Stored Link Key command.

The final authentication request results in a returned 'Link key Request' event.

4.8.5 HCI/AEN/BV-05-C [Read Local OOB Extended Data Command, test unique values]

- Test Purpose

Verify that IUT uses distinctive random numbers to generate the P-192 and P-256 public-private key pairs.

- Reference

[1] 7.3.95

- Initial Condition

The IUT has been HCI reset and has been SSP enabled and Secure Connections enabled by the host via the Write Simple Pairing Mode and the Write Secure Connections Host Support Commands.

- Test Procedure

The Upper Tester issues a Read Local OOB Extended Data Command.

The IUT returns a Command Complete Event with four values C_192, R_192, C_256, and R_256.

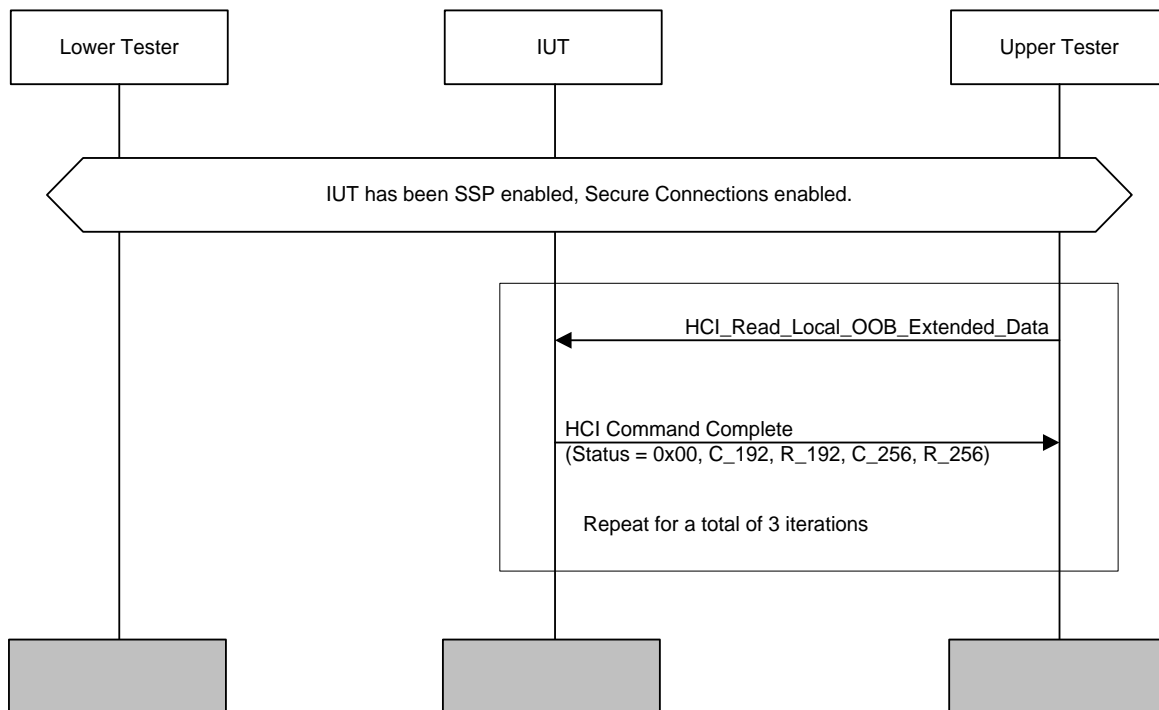


Figure 4.46: HCI/AEN/BV-05-C Read Local OOB Extended Data Command, test unique values

- Expected Outcome

Pass Verdict

For each Read Local OOB Extended Data Command, the values of R_192 and R_256 are different than the preceding set of values. For example, the values returned from the second read command should not be an identical match to the values from the first read command. Similarly, the values from the third read command should not be an identical match to the values from either the first or the second read command. Also, for each read command, the values of R_192 and R_256 should not match each other.

4.8.6 HCI/AEN/BV-06-C [Public Keys]

- Test Purpose

Verify that the IUT can generate a P-256 Public-Private key pair and return the P-256 Public Key.

- Reference

[8] 7.7.65.8, 7.8.36

- Initial Condition

IUT is in standby.

- Test Procedure

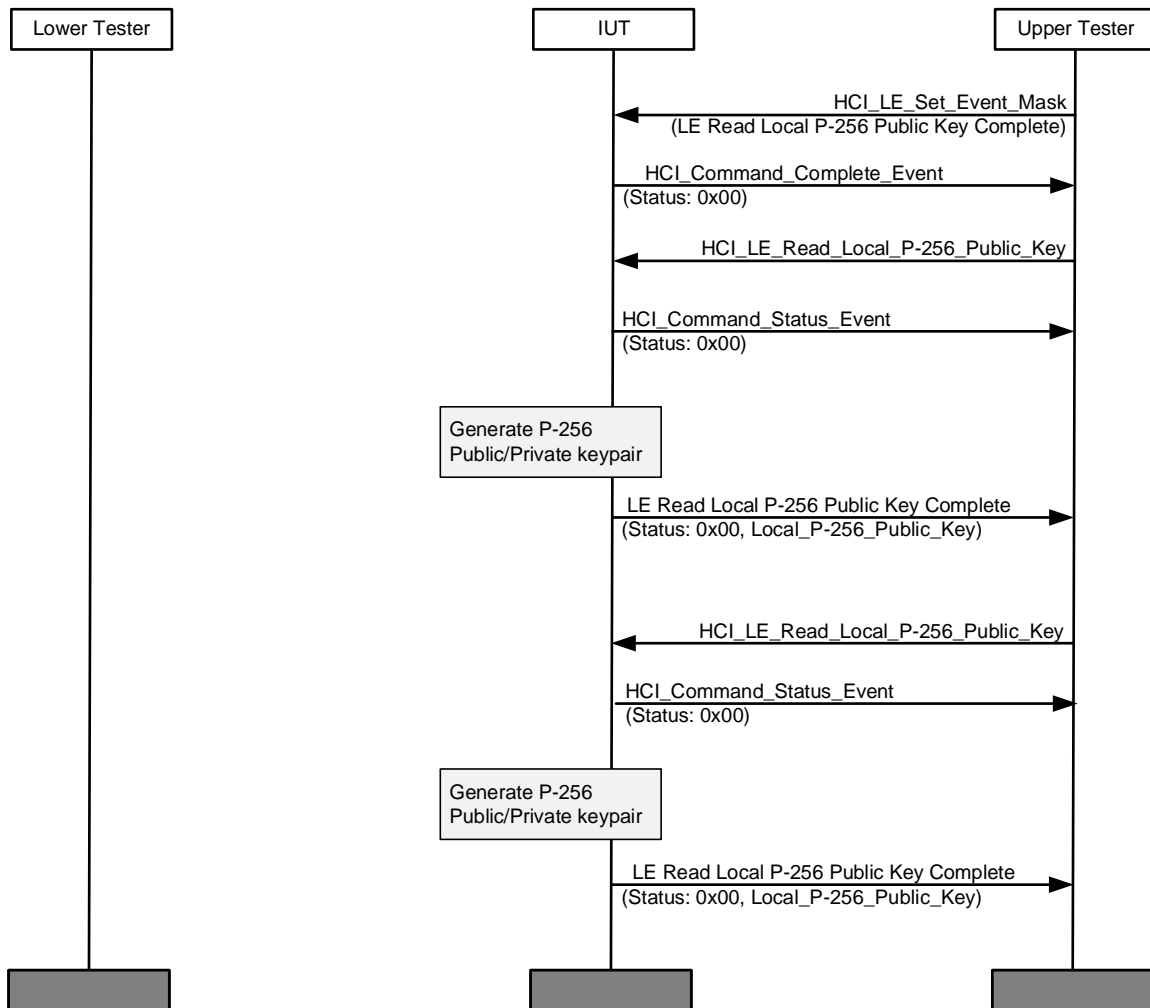


Figure 4.47: HCI/AEN/BV-06-C Public Keys

- Expected Outcome

Pass Verdict

The IUT returns the local P-256 Public Key through the LE Read Local P-256 Public Key Complete event.

When the command is repeated, the IUT generates a new P-256 Public-Private key pair and returns the corresponding Public Key.

4.8.7 HCI/AEN/BV-07-C [Generate DH Keys]

- Test Purpose

Verify that the IUT can generate a new P-256 DHKey.

- Reference

[8] 7.7.65.9, 7.8.37

- Initial Condition
IUT is in standby.
- Test Procedure

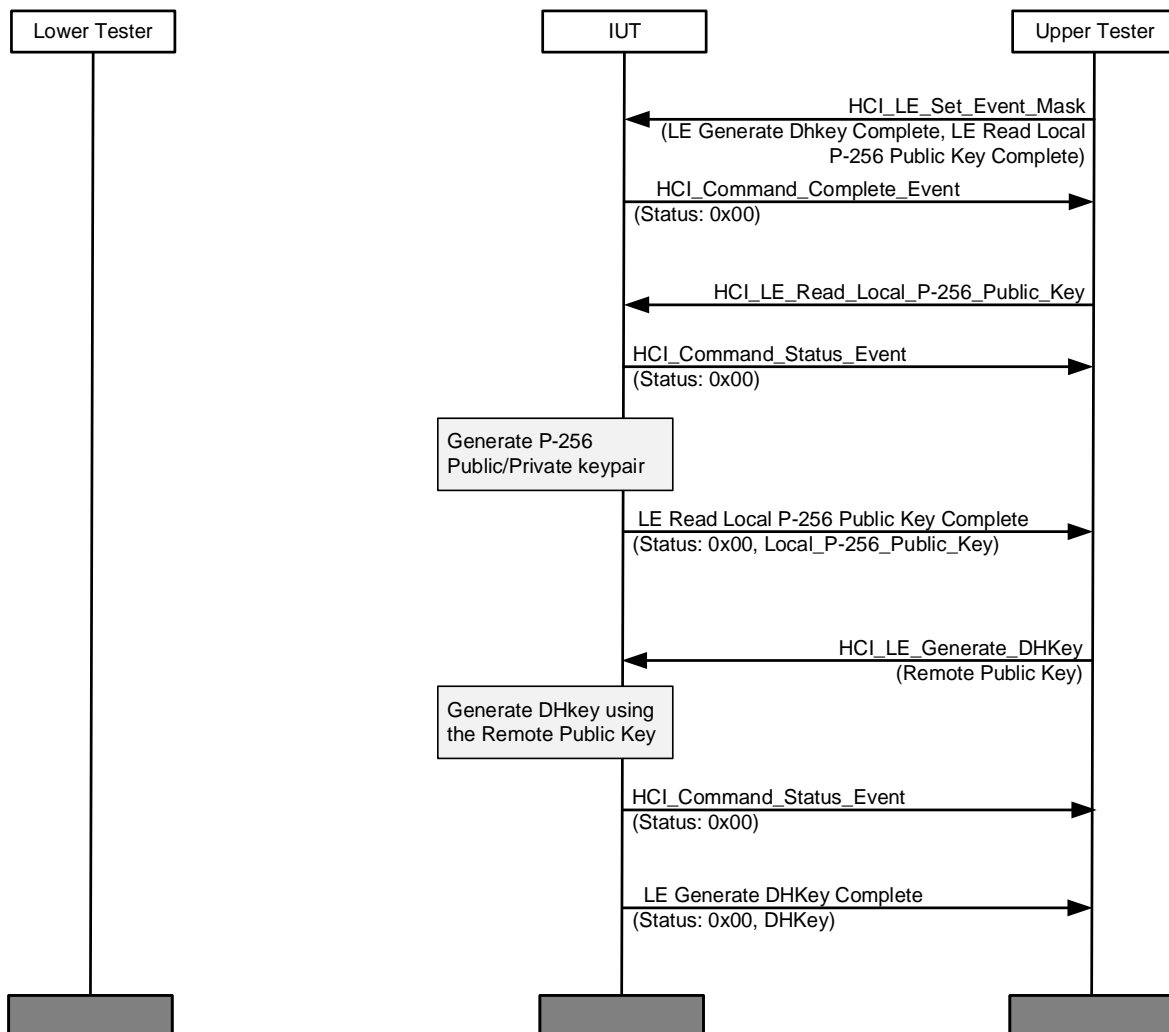


Figure 4.48: HCI/AEN/BV-07-C Generate DH Keys

- Expected Outcome
Pass Verdict

The IUT returns the DHkey through the LE Generate DHKey Complete event. The generated DHkey is verified by the Upper Tester.

- Notes
The Command is applicable only to IUT that supports the LE Secure Connections feature.

4.8.8 HCI/AEN/BV-08-C [Generate Debug Keys]

- Test Purpose
Verify that the IUT can generate a debug key.



- Reference
[12] 7.7.65.9, 7.8.93

- Initial Condition
IUT is in standby.

- Test Procedure

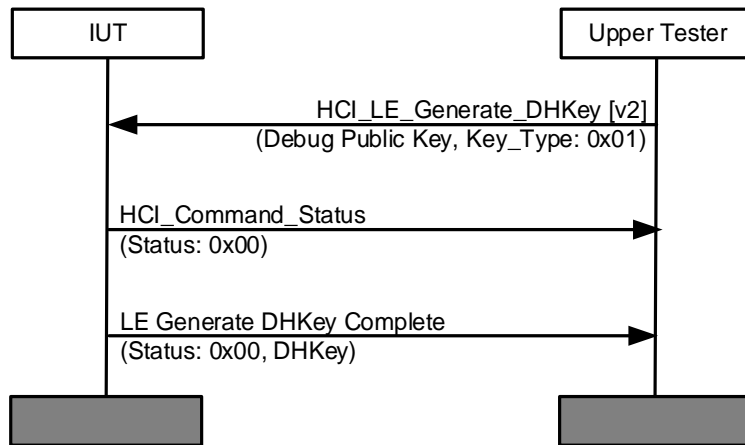


Figure 4.49: HCI/AEN/BV-08-C [Generate Debug Keys]

- Expected Outcome

Pass Verdict

The IUT returns the debug key through the LE Generate DHKey Complete event. The Upper Tester verifies the generated debug key.

4.8.9 HCI/AEN/BI-01-C [Generate DH Key Error With Invalid Point]

- Test Purpose
Verify that the IUT can return an error when invalid public keys are received.

- Reference
[8], [11] 7.7.65.9, 7.8.37

- Initial Condition
IUT is in standby.

- Test Procedure

Run the test once for each of the rounds and generate invalid public keys as specified in [Table 4.9](#) (HCI_LE_Generate_DHKey PDU):

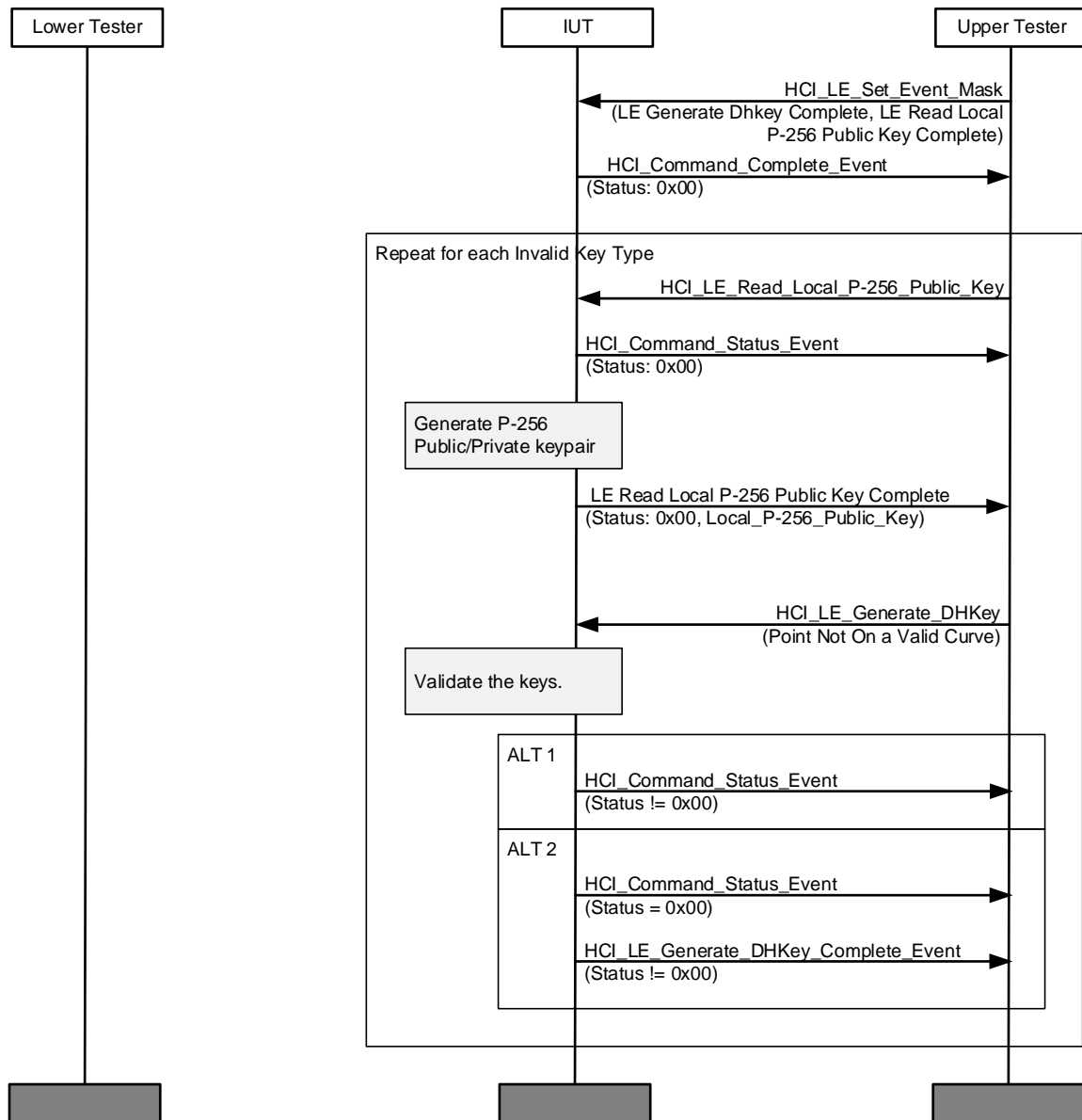


Figure 4.50: HCI/AEN/BI-01-C Generate DH Key Error With Invalid Point

Round	Key Size	Invalid Key Type
1	P-256	Generate valid public key and set y-coordinate = 0,
2	P-256	Generate valid public key and flip a bit in y-coordinate,
3	P-256	Public Key coordinates (0, 0)

Table 4.9: Invalid Public Key generation for each round

- Expected Outcome

Pass Verdict

The IUT returns a HCI Command Status Event with Status != 0 in response to the HCI_LE_Generate_DHKey.

or

The IUT returns a HCI Command Status Event with Status = 0 followed by a LE Generate DHKey Complete event with Status != 0 in response to the HCI_LE_Generate_DHKey command.

4.9 Controller Configuration

Test group objectives:

To verify the controller configuration.

4.9.1 HCI/CCO/BV-01-C [Write Location Data Command/ Read Location Data Command]

- Test Purpose

Verify that the Write Location Data Command/ Read Location Data Command are handled correctly by the IUT.

- Reference

[1] 7.3.70, 7.3.71

- Initial Condition

IUT is in standby.

- Test Procedure

Upper Tester issues Write Location Data Command with preset information to the IUT.

Upper Tester receives success status in the Write Location Data command complete event.

Upper Tester issues Read Location Data Command with preset information to the IUT.

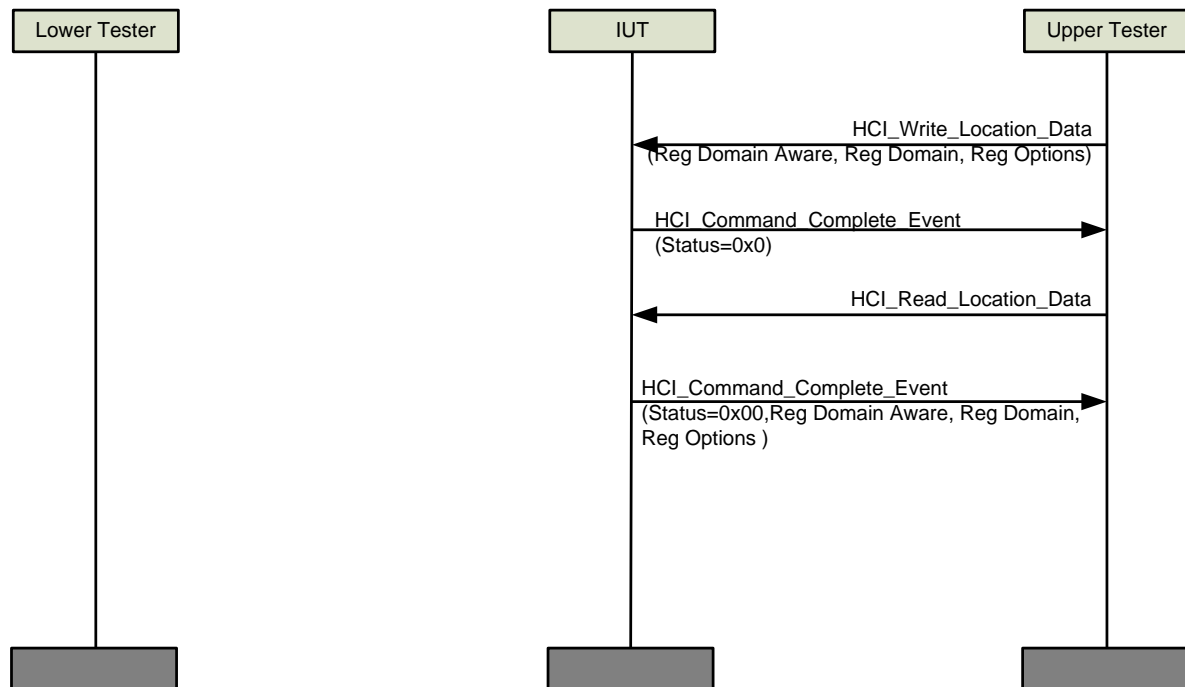


Figure 4.51: HCI/CCO/BV-01-C Write/Read Data Location

- Expected Outcome

Pass Verdict

Upper Tester receives command complete event with success status for two commands. Upper Tester receives the data returned by the Read Location Data command complete event. The received data matches that was used in the Write Location Data Command.

4.9.2 HCI/CCO/BV-02-C [Read LE Host Support Command]

- Test Purpose

Verify that Read LE Host Support command returns with the correct feature bits.

- Reference

[1] 7.3.78

- Initial Condition

IUT is in standby.

- Test Procedure

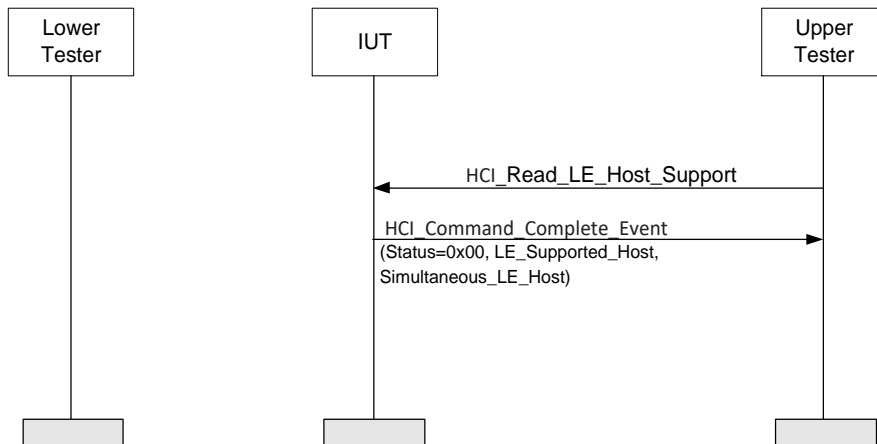


Figure 4.52: HCI/CCO/BV-02-C Read LE Host Support Command

- Test Condition

The manufacturer of the IUT must define LE Host Support supported.

- Expected Outcome

Pass Verdict

The IUT returns command complete to the HCI_Read_LE_Host_Supported command and has the LE_Support_Host and Simultaneous_LE_Host parameters set to the default values of the specification.

4.9.3 HCI/CCO/BV-03-C [Write LE Host Support Command]

- Test Purpose

Verify that Write LE Host Support commands writes *LE_Support_Host* and *Simultaneous_LE_Host* configuration parameters of the IUT.

- Reference

[1] 7.3.79

- Initial Condition

IUT is in standby. The value for Simultaneous_LE_Host parameter shall be set to disabled (0) for IUTs where the manufacturer has declared support for version 4.1 or higher.

- Test Procedure

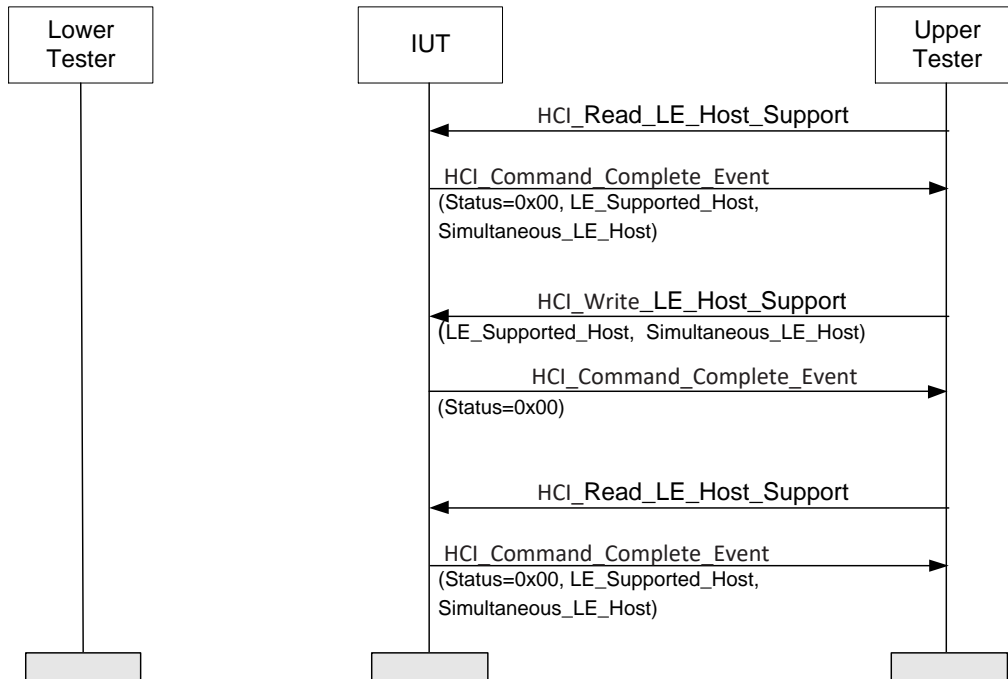


Figure 4.53: HCI/CCO/BV-03-C Write LE Host Support Command

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the Write LE Host Support command.

The IUT returns 'command complete' in response to second Read LE Host Support command.

The IUT returns command complete to the first HCI_Read_LE_Host_Supported command and has the LE_Support_Host and Simultaneous_LE_Host parameters set to the default values of the specification.

4.9.4 HCI/CCO/BV-05-C [LE Not Supported]

- Test Purpose

Verify that an IUT which does not support LE does not recognize LE HCI commands.

- Reference

[1] 6.33

- Initial Condition

IUT is in standby.

- Test Procedure

Upper Tester sends an HCI LE Set Event Mask Command and expects the IUT to return an HCI Command Complete Event or HCI Command Status Event with Status = Unknown HCI Command.

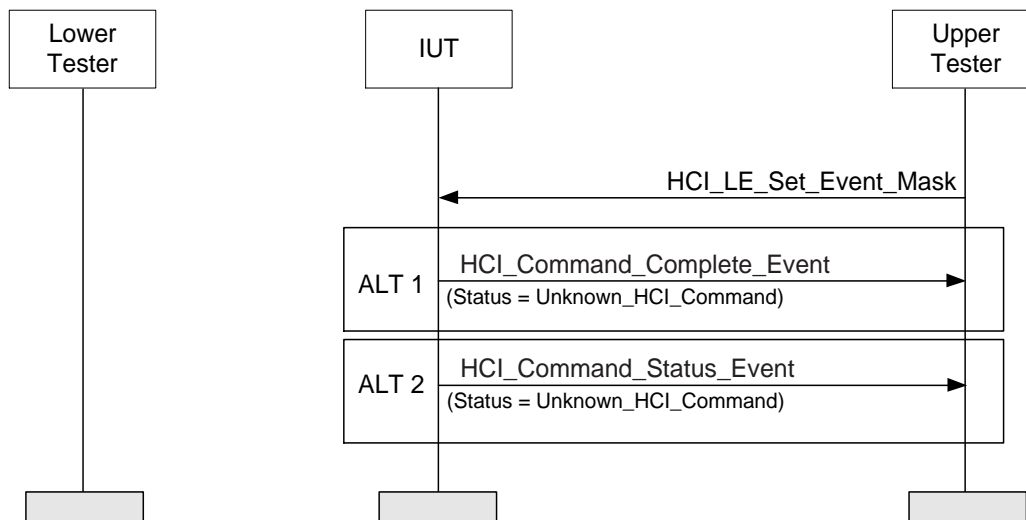


Figure 4.54: HCI/CCO/BV-05-C LE Not Supported

- Expected Outcome

Pass Verdict

The IUT returns an HCI Command Complete or HCI Command Status Event with Status = Unknown_HCI_Command.

4.9.5 HCI/CCO/BV-07-C [BR/EDR Not Supported]

- Test Purpose

Verify that an IUT which supports LE only, does not respond to BR/EDR HCI commands.

- Reference

[1] 3.2

- Initial Condition

IUT is in standby.

- Test Procedure

Upper Tester sends an HCI Inquiry Command and expects the IUT to return an HCI Command Complete Event or HCI Command Status Event with Status = Unknown HCI Command.

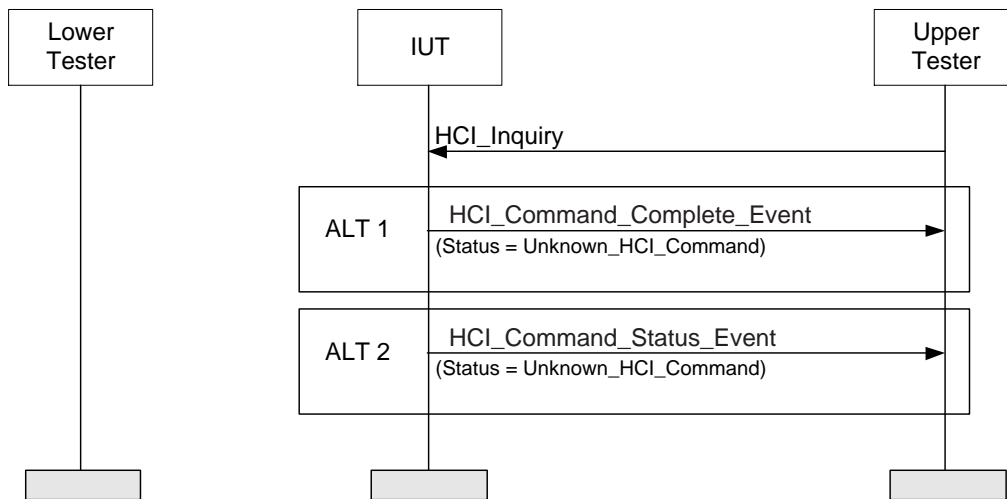


Figure 4.55: HCI/CCO/BV-07-C BR/EDR not supported

- Expected Outcome

Pass Verdict

The IUT returns an HCI Command Complete or HCI Command Status Event with Status = Unknown_HCI_Command.

4.9.6 HCI/CCO/BV-08-C [Read Extended Page Timeout]

- Test Purpose

Verify that the IUT correctly handles Read Extended Page Timeout.

- Reference

[1] 7.3

- Initial Condition

IUT is in standby.

- Test Procedure

- Upper Tester issues HCI_Write_Extended_Page_Timeout Command with preset information to the IUT.
- Upper Tester receives success status in the HCI_Write_Extended_Page_Timeout Command complete event.
- Upper Tester issues HCI_Read_Extended_Page_Timeout Command to the IUT.

- Expected Outcome

Pass Verdict

Upper Tester receives command complete event with success status for the commands sent in a and c.

Upper Tester receives the data returned by the HCI_Read_Extended_Page_Timeout Command complete event. The received data matches the data that was used in the HCI_Write_Extended_Page_Timeout Command.

4.9.7 HCI/CCO/BV-09-C [LE Set Data Length]

- Test Purpose

Verify that the IUT correctly handles the LE Set Data Length Command

- Reference

[2] 7.8.33

- Initial Condition

LL connection established, IUT is Master or Slave.

- Test Procedure

Upper Tester issues an LE Set Data Length command to the IUT containing the current connection handle and with values for TxOctets and TxTime which lie in the permissible range.

Upper Tester receives a Command Complete event from the IUT for the LE Set Data Length command.

If the command causes the maximum transmission packet size or maximum packet transmission time to change, Upper Tester receives an LE Data Length Change event from the IUT containing the updated values.

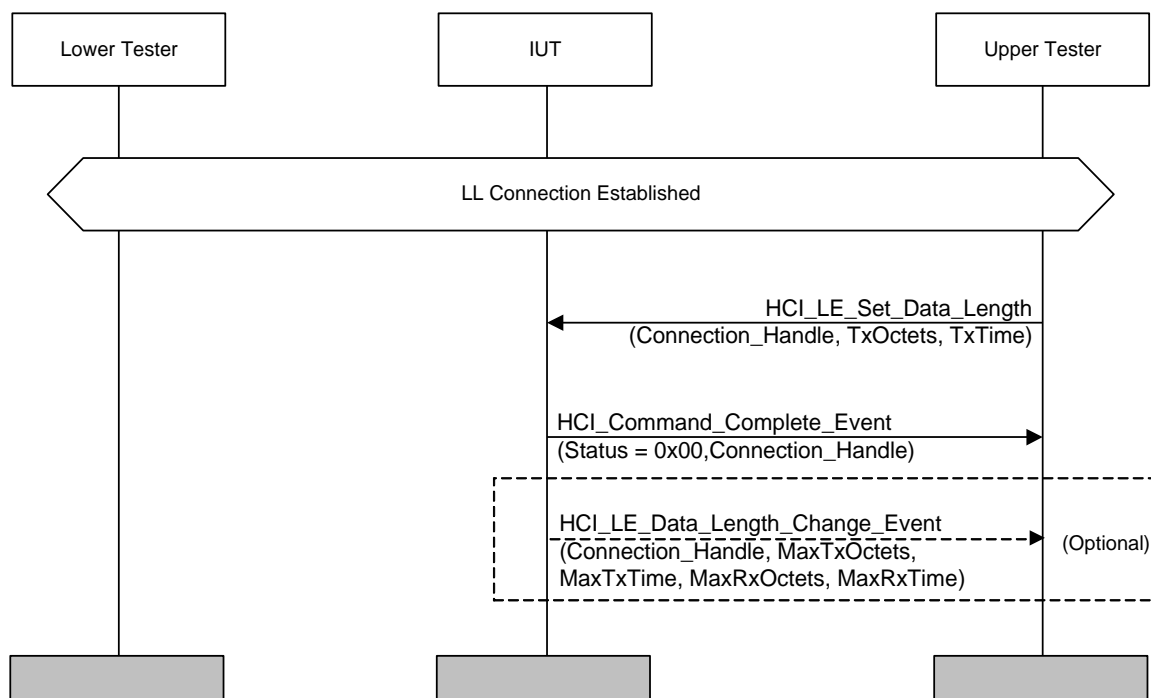


Figure 4.56: HCI/CCO/BV-09-C: LE Set Data Length Command

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status = 0x00 (Success) and with the value for Connection_Handle matching the value sent in the LE Set Data Length Command.

Upper Tester optionally receives an LE Data Length Change event from the IUT with updated maximum transmission packet size and maximum packet transmission time values.

4.9.8 HCI/CCO/BV-10-C [LE Read Suggested Default Data Length Command]

- Test Purpose

Verify that the IUT correctly handles the LE Read Suggested Default Data Length Command

- Reference

[2] 7.8.34

- Initial Condition

IUT has just been reset and is in standby.

- Test Procedure

Upper Tester issues a LE Read Suggested Default Data Length Command to the IUT.

Upper Tester receives a Command Complete event from the IUT for the LE Read Suggested Default Data Length Command.

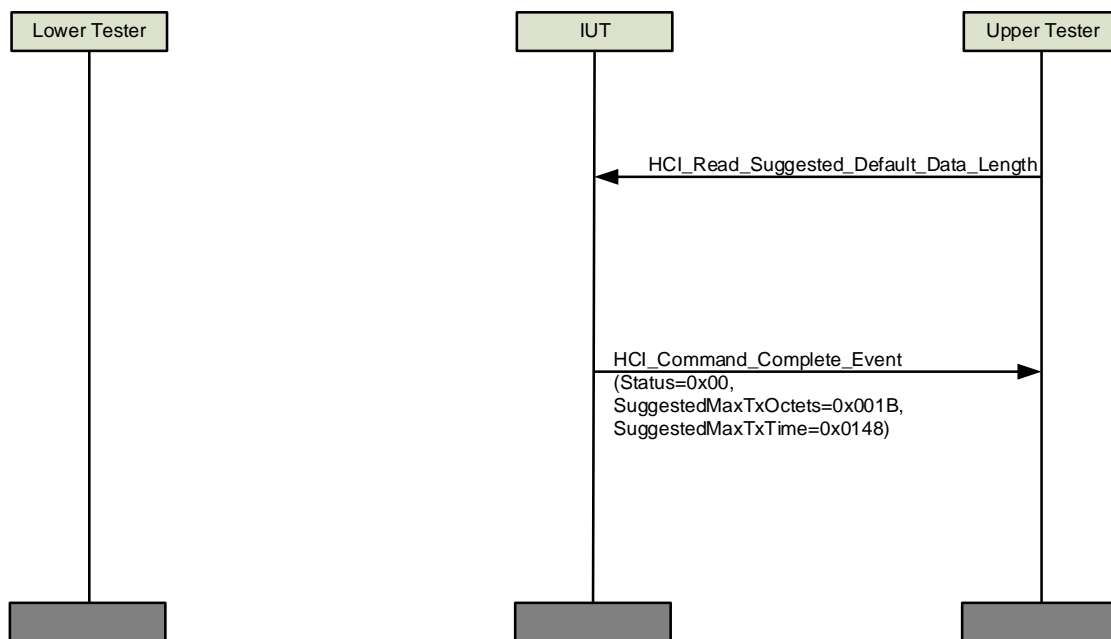


Figure 4.57: HCI/CCO/BV-10-C: LE Read Suggested Default Data Length Command

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status = 0x00 (Success) and with TxOctets equal to 0x001B and TxTime equal to 0x0148.

4.9.9 HCI/CCO/BV-11-C [LE Write Suggested Default Data Length Command]

- Test Purpose

Verify that the IUT correctly handles the LE Write Suggested Default Data Length Command.

- Reference

[2] 7.8.35

- Initial Condition

IUT is in standby.

- Test Procedure

For each row in [Table 4.10](#):

Upper Tester issues a LE Write Suggested Default Data Length Command to the IUT with the values for TxOctets and TxTime given in that row. Upper Tester receives a Command Complete event from the IUT for the LE Write Suggested Default Data Length Command.

Upper Tester issues a LE Read Suggested Default Data Length Command to the IUT. Upper Tester receives a Command Complete event from the IUT for the LE Read Suggested Default Data Length Command.

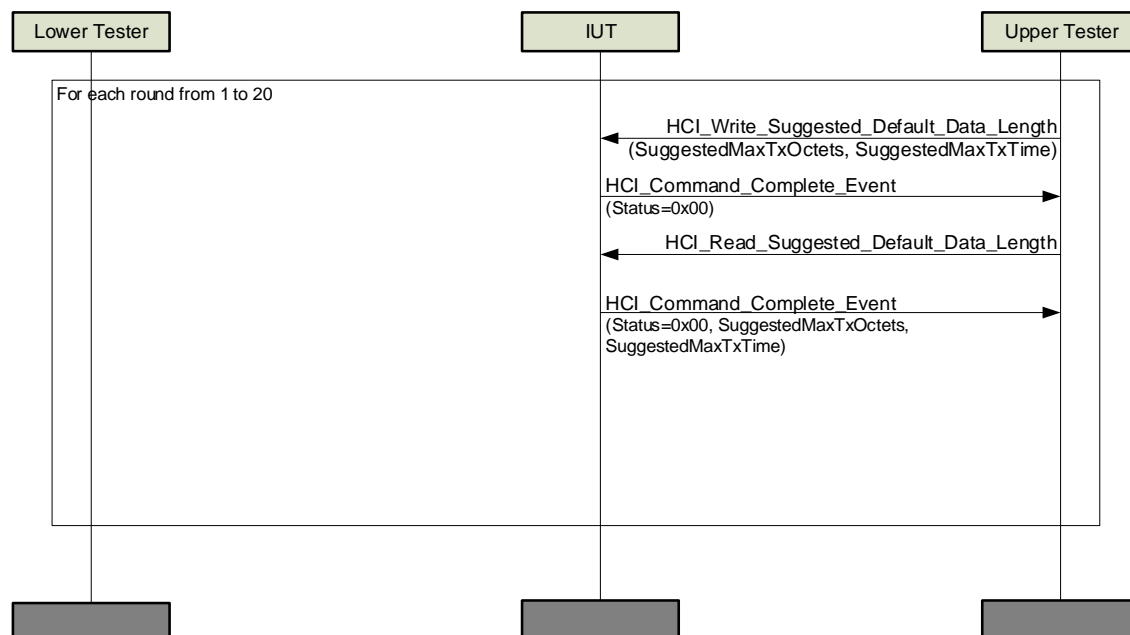


Figure 4.58: HCI/CCO/BV-11-C: LE Write Suggested Default Data Length Command

Round	TxOctets	TxTime
1	0x001B	0x0148
2	0x001B	0x4290
3	0x001B	0x2000
4	0x00FB	0x0148
5	0x00FB	0x4290
6	0x00FB	0x2000
7	0x0080	0x0148
8	0x0080	0x4290
9	0x0080	0x2000
10–20	A randomly selected value between 0x001B and 0x00FB inclusive.	A randomly selected value between 0x0148 and 0x4290 inclusive.

Table 4.10: Rounds for HCI/CCO/BV-11-C

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status=0x00 (Success) for the LE Write Suggested Default Data Length Command.

Upper Tester receives a Command Complete event from the IUT for the LE Read Suggested Default Data Length Command with Status=0x00 (Success).

The values for TxOctets and TxTime in the second Command Complete event equal the values sent in the LE Write Suggested Default Data Length Command.

4.9.10 HCI/CCO/BV-12-C [LE Remove Device From Resolving List Command]

- Test Purpose

Verify that the IUT correctly handles the LE Remove Device From Resolving List Command

- Reference

[2] 7.8.39

- Initial Condition

IUT is in standby.

- Test Procedure

Upper Tester issues an LE Add Device To Resolving List Command to the IUT with a peer device identity.



Upper Tester receives a Command Complete event from the IUT for the LE Add Device To Resolving List Command.

Upper Tester issues an LE Remove Device From Resolving List Command to the IUT with the recently added peer device identity.

Upper Tester receives a Command Complete event from the IUT for the LE Remove Device From Resolving List Command.

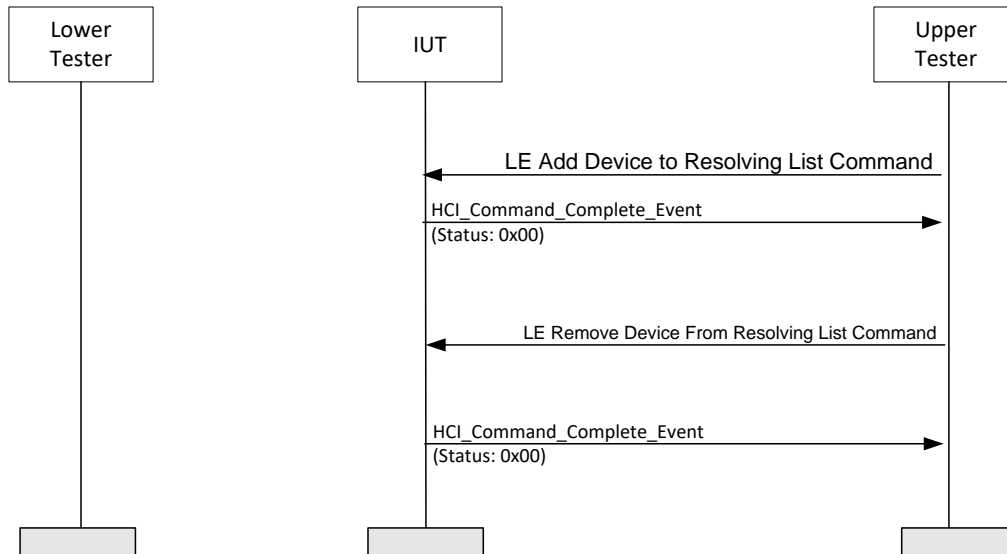


Figure 4.59: HCI/CCO/BV-12-C: LE Remove Device From Resolving List Command

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status = 0x00 (Success) when sending the LE Remove Device From Resolving List Command with a valid device identity.

4.9.11 HCI/CCO/BV-13-C [LE Clear Resolving List Command]

- Test Purpose

Verify that the IUT correctly handles the LE Clear Resolving List Command

- Reference

[2] 7.8.40

- Initial Condition

IUT is in standby.

- Test Procedure

Upper Tester issues an LE Add Device To Resolving List Command to the IUT with a peer device identity.

Upper Tester receives a Command Complete event from the IUT for the LE Add Device To Resolving List Command.

Upper Tester issues an LE Clear Resolving List Command to the IUT with the recently added peer device identity.

Upper Tester receives a Command Complete event from the IUT for the LE Clear Resolving List Command.

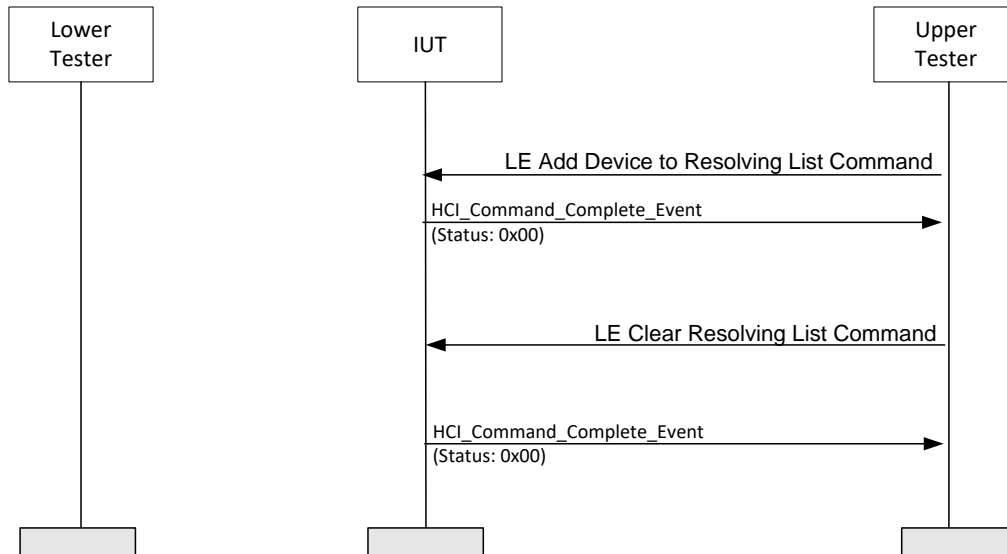


Figure 4.60: HCI/CCO/BV-13-C: LE Clear Resolving List Command

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status = 0x00 (Success) when sending the LE Clear Resolving List Command.

4.9.12 HCI/CCO/BV-14-C [LE Read Resolving List Size Command]

- Test Purpose

Verify that the IUT correctly handles the LE Read Resolving List Size Command

- Reference

[2] 7.8.41

- Initial Condition

IUT is in standby.

- Test Procedure

Upper Tester issues an LE Read Resolving List Size Command to the IUT.

Upper Tester receives a Command Complete event from the IUT for the LE Read Resolving List Size Command, with the size of the list.

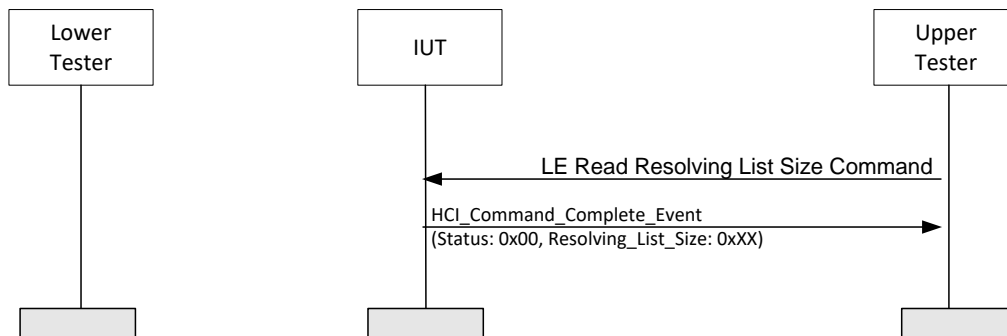


Figure 4.61: HCI/CCO/BV-14-C: LE Read Resolving List Size Command

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status = 0x00 (Success) and Resolving_List_Size = 0xXX when sending the LE Read Resolving List Size Command.

4.9.13 HCI/CCO/BV-15-C [LE Set Default PHY Command]

- Test Purpose

Verify that the IUT correctly handles the LE Set Default PHY Command.

- Reference

[9] 7.8.48

- Initial Condition

IUT is in standby.

- Test Procedure

Upper Tester issues an LE Set Default PHY command to the IUT with ALL_PHYS set to 0x03 (All PHYs Allowed) and both the TX_PHYS and RX_PHYS fields set to zero (no preferences).

Upper Tester receives a Command Complete event from the IUT for the LE Set Default PHY command.

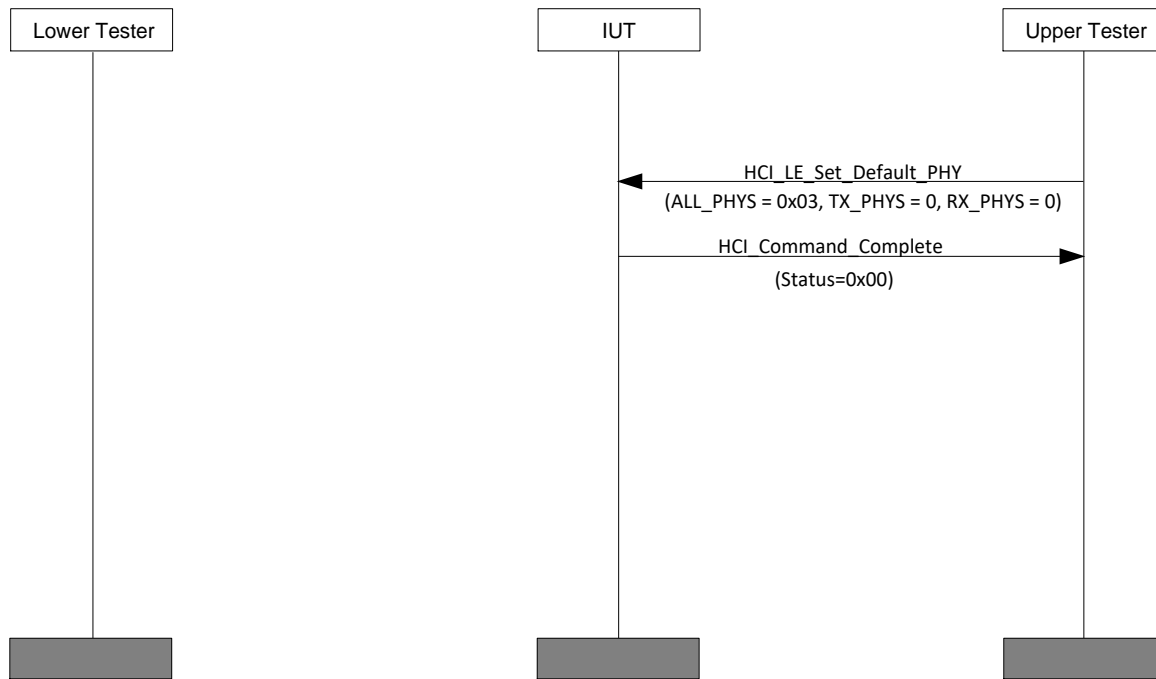


Figure 4.62: HCI/CCO/BV-15-C: LE Set Default PHY Command

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status = 0x00 (Success).

4.9.14 HCI/CCO/BV-16-C [LE Read Periodic Advertiser List Size Command]

- Test Purpose

Verify that the IUT correctly handles the LE Read Periodic Advertiser List Size Command.

- Reference

[9] 7.8.73

- Initial Condition

The IUT is in standby.

- Test Procedure

Upper Tester issues an LE Read Periodic Advertiser List Size Command.

Upper Tester receives a Command Complete event from the IUT for the LE Read Periodic Advertiser List Size Command, with the size of the list.

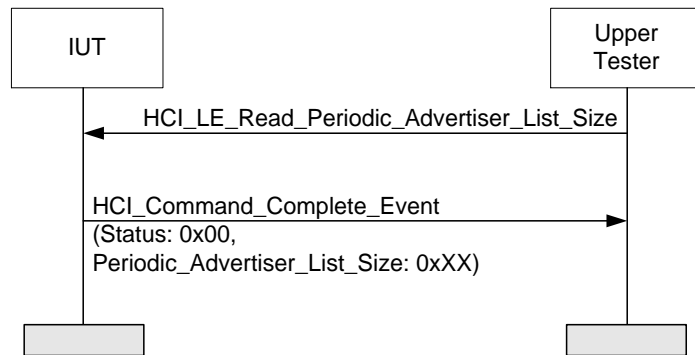


Figure 4.63: HCI/CCO/BV-16-01-C [LE Read Periodic Advertiser List Size Command]

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete Event with Status = 0x00 (Success) and Periodic_Advertiser_List_Size = 0xXX after sending the LE Read Periodic Advertiser List Size command.

4.9.15 HCI/CCO/BV-17-C [LE Add/Remove/Clear Periodic Advertiser List Commands]

- Test Purpose

Verify that the IUT correctly handles the LE Add Device To Periodic Advertiser List, LE Remove Device From Periodic Advertiser List, and Clear Periodic Advertiser List commands.

- Reference

[9] 7.8.70, 7.8.71, 7.8.72

- Initial Condition

The IUT is in standby.

The IUT's Periodic Advertiser List is empty.

- Test Procedure

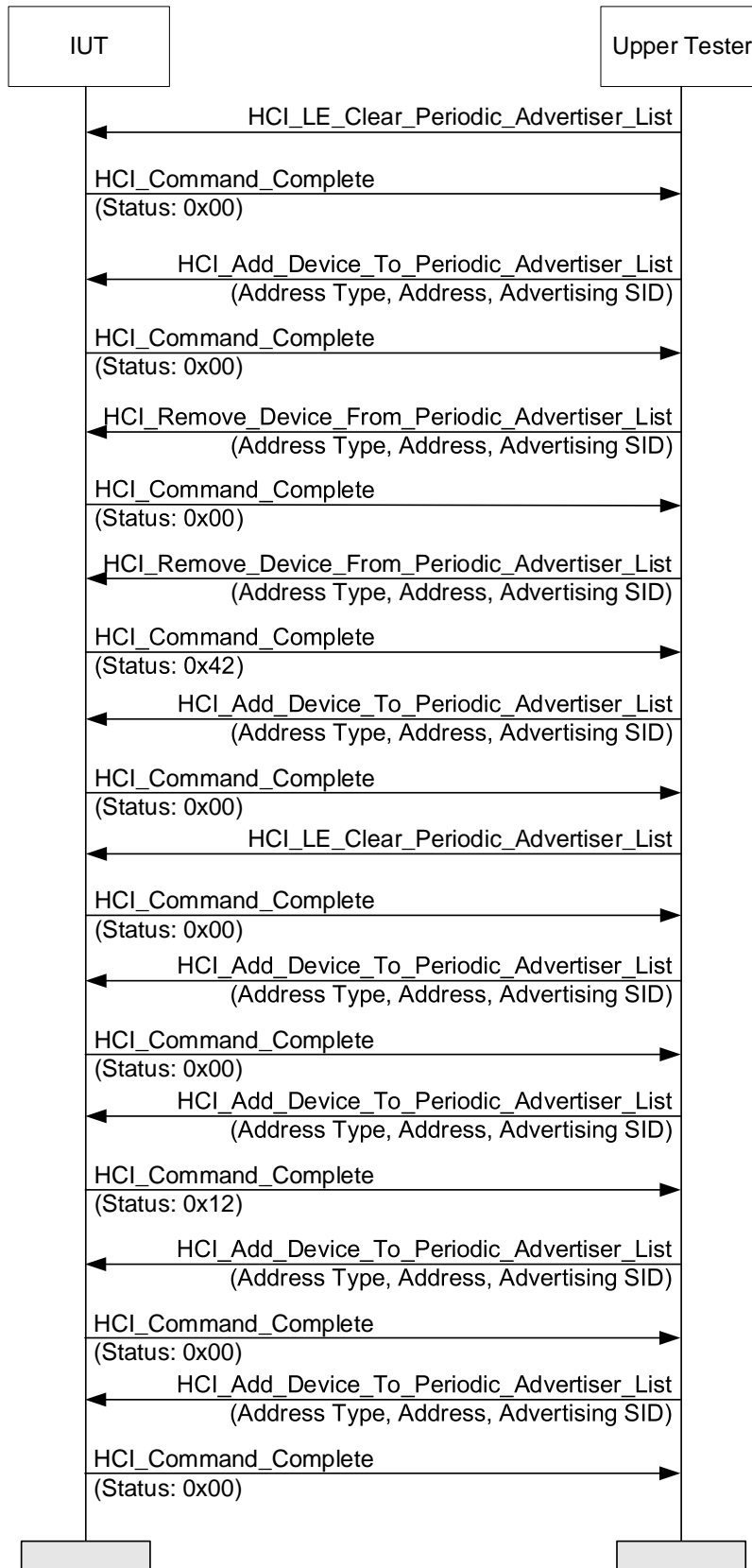


Figure 4.64: HCI/CCO/BV-17-C [LE Add/Remove/Clear Periodic Advertiser List Commands]

1. The Upper Tester sends an HCI_LE_Clear_Periodic_Advertiser_List command to the IUT and expects an HCI_Command_Complete event from the IUT with Status set to 0x00 (Success).
2. The Upper Tester sends an HCI_LE_Add_Device_To_Periodic_Advertiser_List command to the IUT with an arbitrarily chosen valid address, address type, and SID and expects an HCI_Command_Complete event from the IUT with Status set to 0x00 (Success).
3. The Upper Tester sends an HCI_LE_Remove_Device_From_Periodic_Advertiser_List command to the IUT with the parameter values from Step 2 and expects an HCI_Command_Complete event from the IUT with Status set to 0x00 (Success).
4. The Upper Tester sends an HCI_LE_Remove_Device_From_Periodic_Advertiser_List command to the IUT with the parameter values from Step 2 and expects an HCI_Command_Complete event from the IUT with the Status set to 0x42 (Unknown Advertising Identifier).
5. The Upper Tester sends an HCI_LE_Add_Device_To_Periodic_Advertiser_List command to the IUT with with the same address, address type, and SID as used in step 2 and expects an HCI_Command_Complete event from the IUT with Status set to 0x00 (Success).
6. The Upper Tester sends an HCI_LE_Clear_Periodic_Advertiser_List command to the IUT and expects an HCI_Command_Complete event from the IUT with Status set to 0x00 (Success).
7. The Upper Tester sends an HCI_LE_Add_Device_To_Periodic_Advertiser_List command to the IUT with the same address, address type, and SID as used in step 2 and expects an HCI_Command_Complete event from the IUT with Status set to 0x00 (Success).
8. The Upper Tester sends an HCI_LE_Add_Device_To_Periodic_Advertiser_List command to the IUT with the same address, address type, and SID as used in step 2 and expects an HCI_Command_Complete event from the IUT with Status set to 0x12 (Invalid HCI Command Parameters).
9. The Upper Tester sends an HCI_LE_Add_Device_To_Periodic_Advertiser_List command to the IUT with the same address and address type as used in step 2 but a different SID and expects an HCI_Command_Complete event from the IUT with Status set to 0x00 (Success).
10. The Upper Tester sends an HCI_LE_Add_Device_To_Periodic_Advertiser_List command to the IUT with the same address and SID as step 2 but a different address type and expects an HCI_Command_Complete event from the IUT with Status set to 0x00 (Success).

- Expected Outcome

Pass Verdict

The Upper Tester receives an HCI_Command Complete event with the expected status for each command.

4.9.16 HCI/CCO/BV-18-C [LE Read Transmit Power Command]

- Test Purpose

Verify that the IUT correctly handles the LE Read Transmit Power Command.

- Reference

[9] 7.8.74

- Initial Condition

The IUT is in standby.

- Test Procedure

Upper Tester issues an HCI_LE_Read_Transmit_Power Command.



Upper Tester receives a Command Complete event from the IUT with Status set to 0x00 (Success) and values for Min_Tx_Power and Max_Tx_Power.

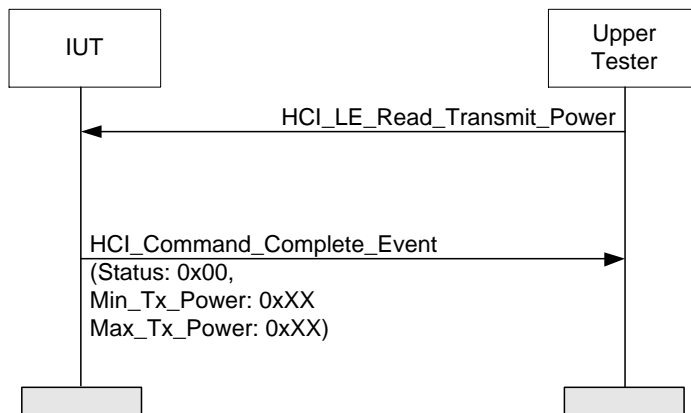


Figure 4.65: HCI/CCO/BV-18-C [LE Read Transmit Power Command]

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete Event with Status = 0x00 (Success), Min_Tx_Power = 0xXX, and Max_Tx_Power = 0xXX after sending the LE Read Transmit Power command.

4.9.17 HCI/CCO/BV-19-C [LE Write RF Path Compensation Command]

- Test Purpose

Verify that the IUT correctly handles the LE Write RF Path Compensation Command.

- Reference

[9] 7.8.76

- Initial Condition

The IUT is in standby.

- Test Procedure

Upper Tester issues an HCI_LE_Write_RF_Path_Compensation Command with RF_Tx_Path_Compensation_Value set to 0x0001 and RF_Rx_Path_Compensation_Value set to 0x0001.

Upper Tester receives a Command Complete event from the IUT with Status set to 0x00 (Success).

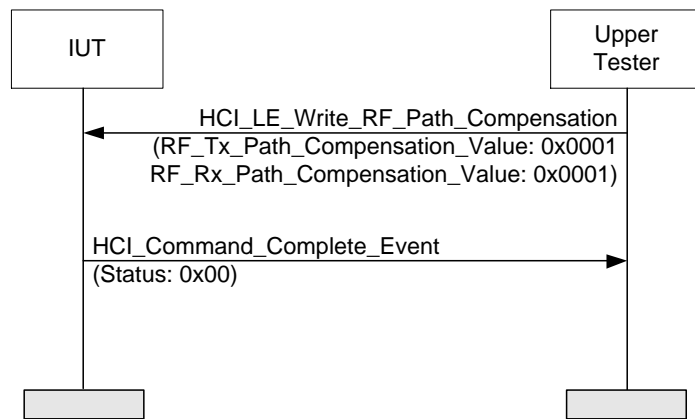


Figure 4.66: HCI/CCO/BV-19-C [LE Write RF Path Compensation Command]

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete Event with Status = 0x00 (Success) after sending the LE Write RF Path Compensation Command.

4.9.18 HCI/CCO/BV-20-C [LE Read RF Path Compensation Command]

- Test Purpose

Verify that the IUT correctly handles the LE Read RF Path Compensation Command.

- Reference

[9] 7.8.75

- Initial Condition

The IUT is in standby.

- Test Procedure

Upper Tester issues an HCI_LE_Read_RF_Path_Compensation Command.

Upper Tester receives a Command Complete event from the IUT with Status set to 0x00 (Success) and values for RF_Tx_Path_Compensation_Value and RF_Rx_Path_Compensation_Value.

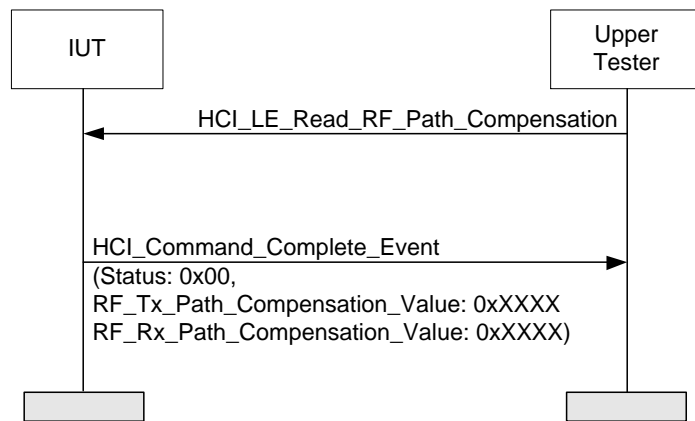


Figure 4.67: HCI/CCO/BV-20-C [LE Read RF Path Compensation Command]

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete Event with Status = 0x00 (Success), RF_Tx_Path_Compensation_Value = 0xFFFF, and RF_Rx_Path_Compensation_Value = 0xFFFF after sending the LE Read RF Path Compensation Command.

4.9.19 [Resolving List Commands fail when list in use]

- Test Purpose

Verify that the IUT correctly fails the Resolving List commands when the resolving list is in use.

- Reference

[2] 7.8.38, 7.8.39, 7.8.40, 7.8.44, 7.8.77

- Initial Condition

IUT is in standby.

IUT has address resolution enabled with at least one device identity added to the resolving list.

- Test Procedure

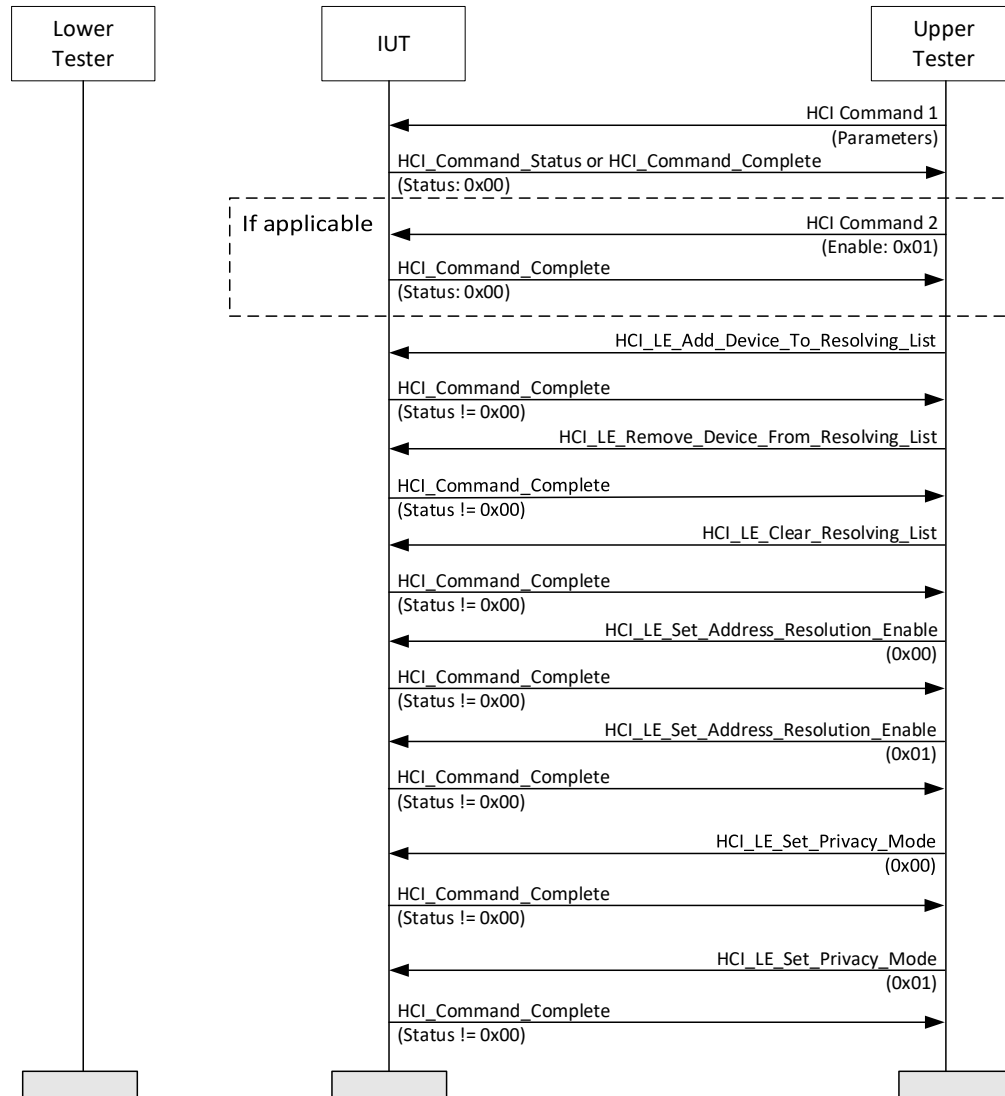


Figure 4.68: Resolving List Commands fail when list in use MSC

The Upper Tester issues the one or two commands specified in [Table 4.11](#) to the IUT and expects a successful HCI_Command_Complete or HCI_Command_Status event in return for each.

The Upper Tester issues each of the following commands to the IUT and expects an HCI_Command_Complete event with a non-zero status in reply for each:

- HCI_LE_Add_Device_To_Resolving_List
- HCI_LE_Remove_Device_From_Resolving_List
- HCI_LE_Clear_Resolving_List
- HCI_LE_Set_Address_Resolution_Enable (Address_Resolution_Enable = 0x00)
- HCI_LE_Set_Address_Resolution_Enable (Address_Resolution_Enable = 0x01)

- HCI_LE_Set_Privacy_Mode (Peer_Identity_Address_Type = 0x00)
- HCI_LE_Set_Privacy_Mode (Peer_Identity_Address_Type = 0x01)
- Test Case Configuration

Test Case	Reference	HCI Command(s)
HCI/CCO/BI-01-C	[2] 7.8.38	HCI_LE_Set_Advertising_Parameters (Advertising_Type: 0x03) HCI_LE_Set_Advertising_Enable (Advertising_Enable: 0x01)
HCI/CCO/BI-02-C	[2] 7.8.39	HCI_LE_Set_Scan_Parameters (LE_Scan_Type: 0x01) HCI_LE_Set_Scan_Enable (LE_Scan_Enable: 0x01)
HCI/CCO/BI-03-C	[2] 7.8.40	HCI_LE_Create_Connection (Initiator_Filter_Policy: 0x00)
HCI/CCO/BI-04-C	[2] 7.8.44	HCI_LE_Extended_Create_Connection (Initiator_Filter_Policy: 0x00)
HCI/CCO/BI-05-C	[2] 7.8.77	HCI_LE_Periodic_Advertising_Create_Sync (Options: 0x00)

Table 4.11: Resolving List Commands fail when list in use test case configuration

All command parameters not explicitly listed in the table may have any valid value.

- Expected Outcome

Pass Verdict

The Upper Tester receives an HCI_Command_Complete event from the IUT with non-zero status when sending each Resolving List command.

4.10 Controller Setup

4.10.1 HCI/CSE/BV-01-C [Logical Link Cancel Command]

- Test Purpose

Verify that the Logical Link Cancel command does cancel a Create Logical Link command before the logical link is totally established.

- Reference

[\[1\]](#) 7.1.40, 7.1.43



- Initial Condition
IUT is the initiator.
- Test Procedure
Upper Tester sends Create Logical Link command to the IUT.

Upper Tester receives command status event with success.

Upper Tester sends Logical Link Cancel command right away.

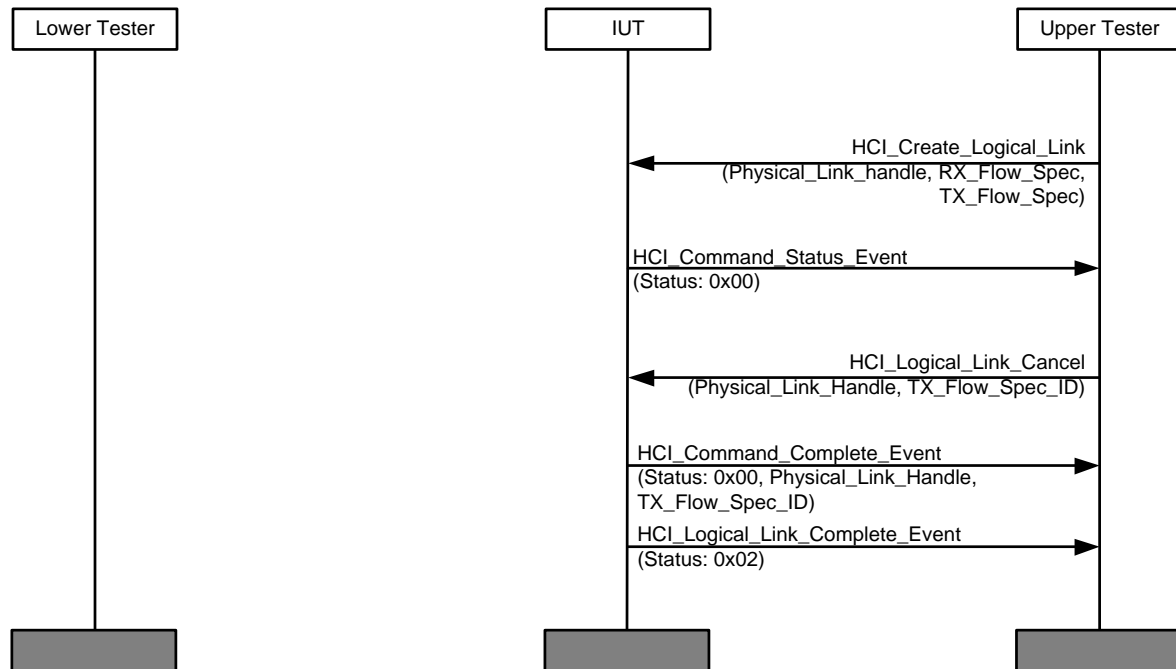


Figure 4.69: HCI/CSE/BV-01-C Logical Link Cancel Command

- Expected Outcome

Pass Verdict

Command Complete event for Logical Link Cancel is received by the Upper Tester.

Logical Link Complete event with error code Unknown Connection Identifier (0x02) is received by the Upper Tester.

4.10.2 HCI/CSE/BV-02-C [Logical Link Cancel Command]

- Test Purpose
Verify that the Logical Link Cancel command does cancel a Create Logical Link command before the logical link is totally established.
- Reference
[\[1\]](#) 7.1.41, 7.1.43

- Initial Condition

IUT is the responder and it has received Accept Logical Link Request command.

- Test Procedure

Upper Tester sends Accept Logical Link command to the IUT.

Upper Tester receives command status event with success.

Upper Tester sends Logical Link Cancel command right away.

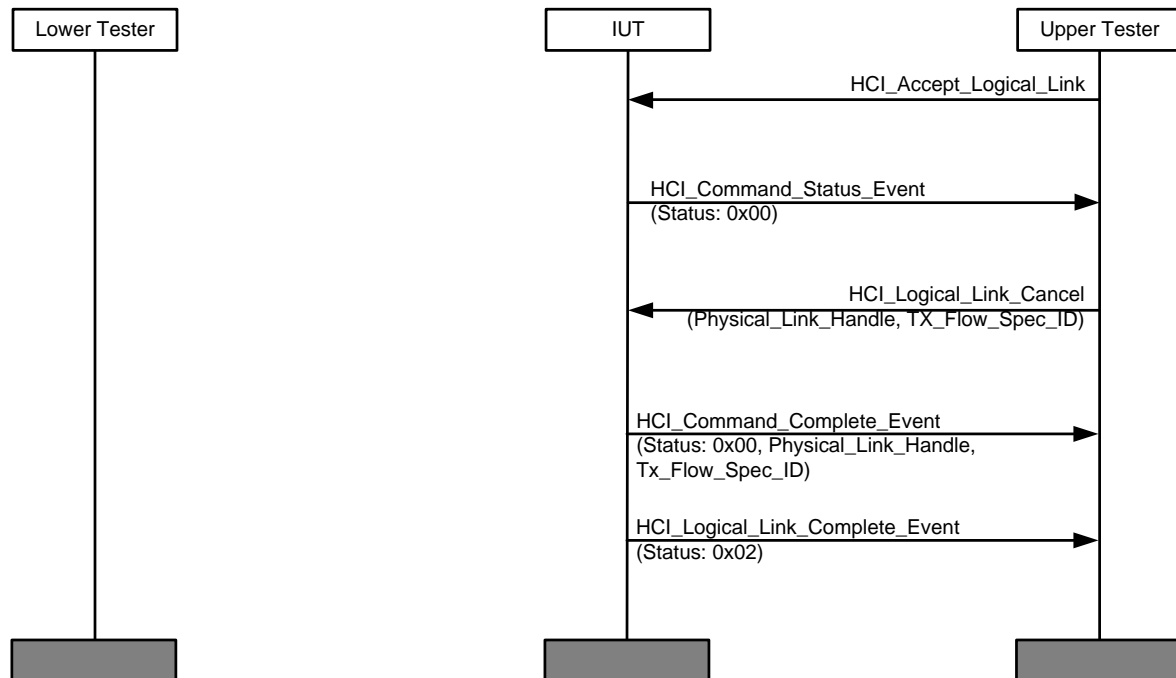


Figure 4.70: HCI/CSE/BV-02-C: Logical Link Cancel Command

- Expected Outcome

Pass Verdict

Command Complete event for Logical Link Cancel is received by the Upper Tester.

Logical Link Complete event with error code Unknown Connection Identifier (0x02) is received by the Upper Tester.

4.10.3 HCI/CSE/BI-03-C [Logical Link Cancel Command]

- Test Purpose

Verify that the Logical Link Cancel command is handled correctly after the logical link has been established already.

- Reference

[1] 7.1.43

- Initial Condition
IUT and Lower Tester have a Logical Link established already.
- Test Procedure
Upper Tester sends Logical Link Cancel command to the IUT.

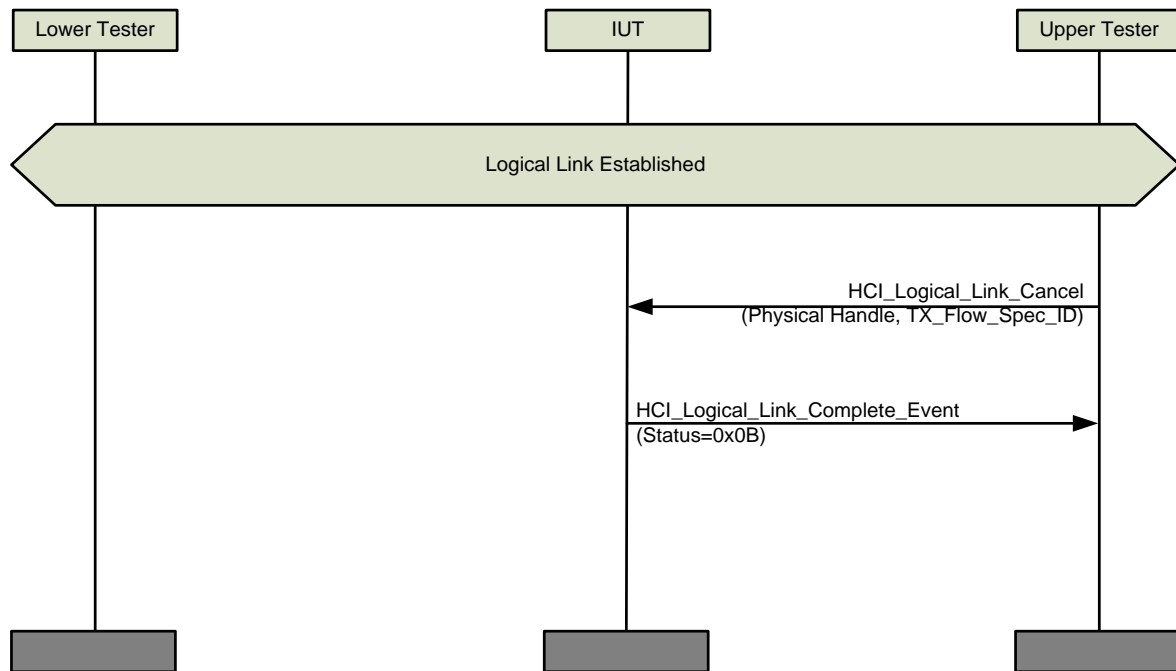


Figure 4.71: HCI/CSE/BI-03-C Logical Link (Logical Link Cancel Command)

- Expected Outcome

Pass Verdict

Command Complete event for Logical Link Cancel is received by the Upper Tester with error code ACL Connection Already Exists (0x0B).

4.10.4 HCI/CSE/BI-04-C [Logical Link Cancel Command]

- Test Purpose
Verify that the Logical Link Cancel command is handled correctly if there is no logical link or an invalid logical link handle is given.
- Reference
[\[1\]](#) HCI 7.1.43
- Initial Condition
IUT and Lower Tester do not have any Logical Links established.
- Test Procedure
Upper Tester sends Logical Link Cancel command to the IUT.

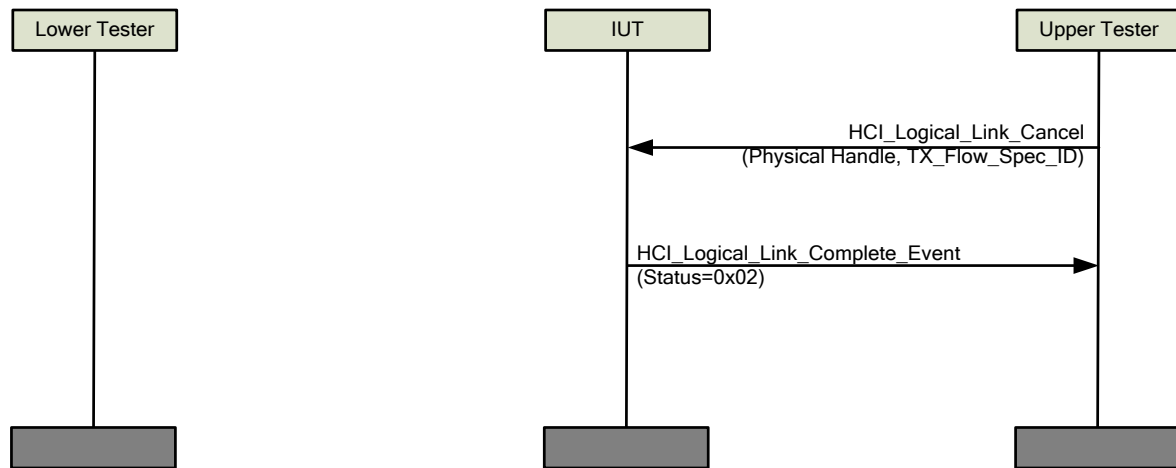


Figure 4.72: HCI/CSE/BI-04-C

- Expected Outcome

Pass Verdict

Command Complete event for Logical Link Cancel is received by the Upper Tester with error code Unknown Connection Identifier (0x02).

4.10.5 HCI/CSE/BV-05-C [Write Logical Link Accept Timeout Command/Read Logical Link Accept Timeout Command]

- Test Purpose

Verify that the Write Logical Link Accept Timeout Command and Read Logical Link Accept Timeout Command are handled correctly by the IUT.

- Reference

[1] 7.3.15, 7.3.16

- Initial Condition

IUT is in standby.

- Test Procedure

Upper Tester issues Write Logical Link Accept Timeout Command with preset information to the IUT.

Upper Tester receives success status in the Write Logical Link Accept Timeout Command complete event.

Upper Tester issues Read Logical Link Accept Timeout Command with preset information to the IUT.

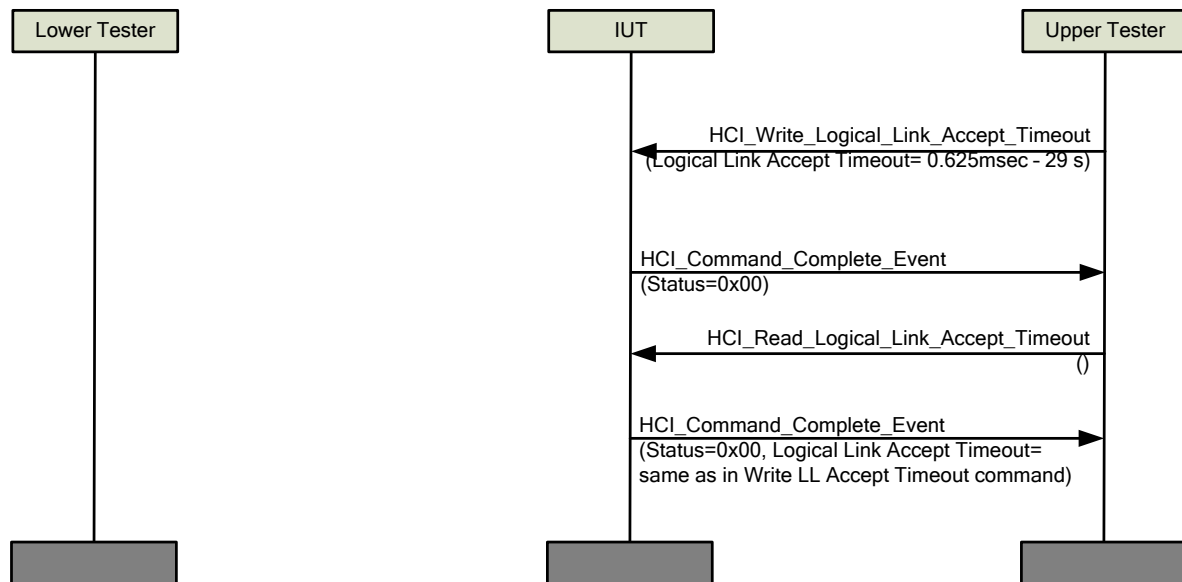


Figure 4.73: HCI/CSE/BV-05-C Logical Link Cancel Command

- Expected Outcome

Pass Verdict

Upper Tester receives command complete event with success status for two commands. Upper Tester receives the data returned by the Read Logical Link Accept Timeout Command complete event. The received data matches that was used in the Write Logical Link Accept Timeout Command.

4.10.6 HCI/CSE/BV-06-C [Verify Truncated Paging]

- Test Purpose

Verify that:

The Truncated Page command configures the IUT to perform a Truncated Page procedure.

The IUT generates Truncated Page Complete event.

- Reference

[1] 7.1, 7.7

- Initial Condition

IUT is in Standby.

Lower Tester is performing R1 Interlaced Scans.

- Test Procedure

Upper Tester sends HCI Truncated Page command to the IUT and expects HCI Command Status pending.

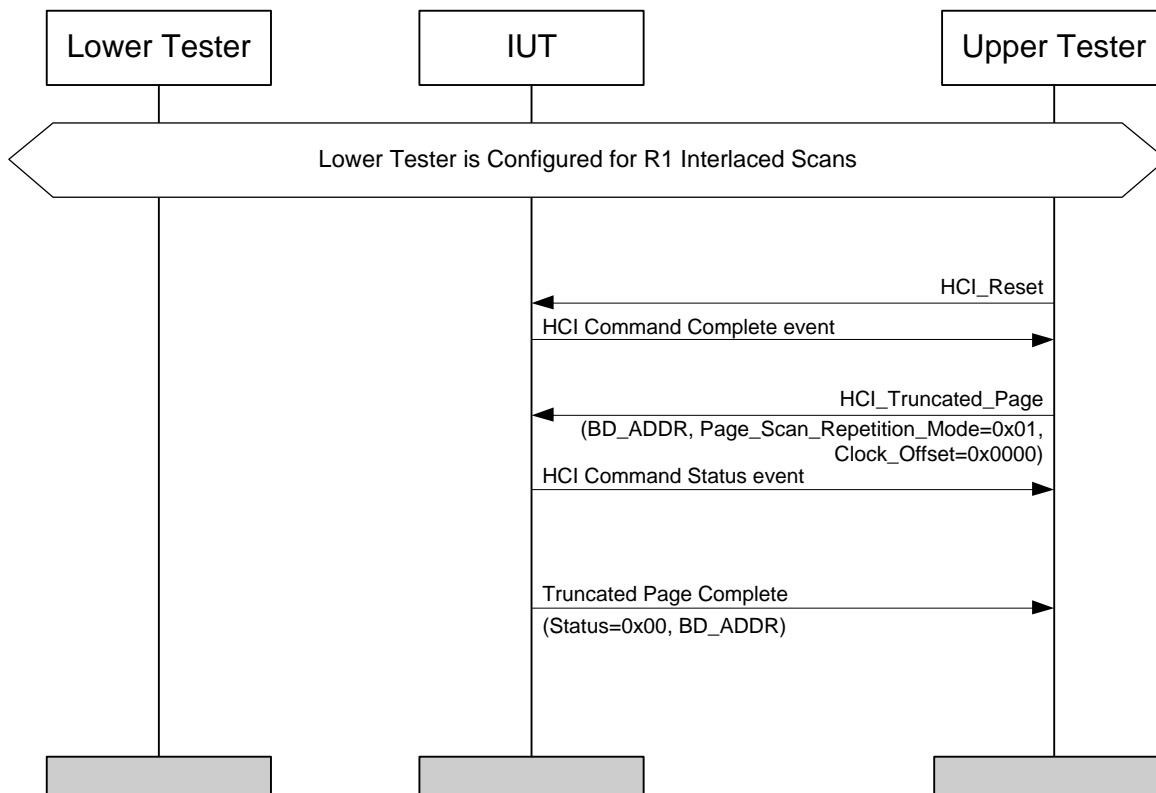


Figure 4.74: HCI/CSE/BV-06-C

- Expected Outcome

Pass Verdict

The IUT performs a Truncated Page procedure on the Lower Tester AND

The IUT generates a Truncated Page Complete event with Status = Success.

4.10.7 HCI/CSE/BV-07-C [Page Response Timeout Detection]

- Test Purpose

Verify that the IUT generates a Page Response Timeout event.

- Reference

[1] 7.7

- Initial Condition

IUT is in configured for R1 Page Scans.

Lower Tester is in Standby.

- Test Procedure

Lower Tester performs Truncated Paging on the IUT.

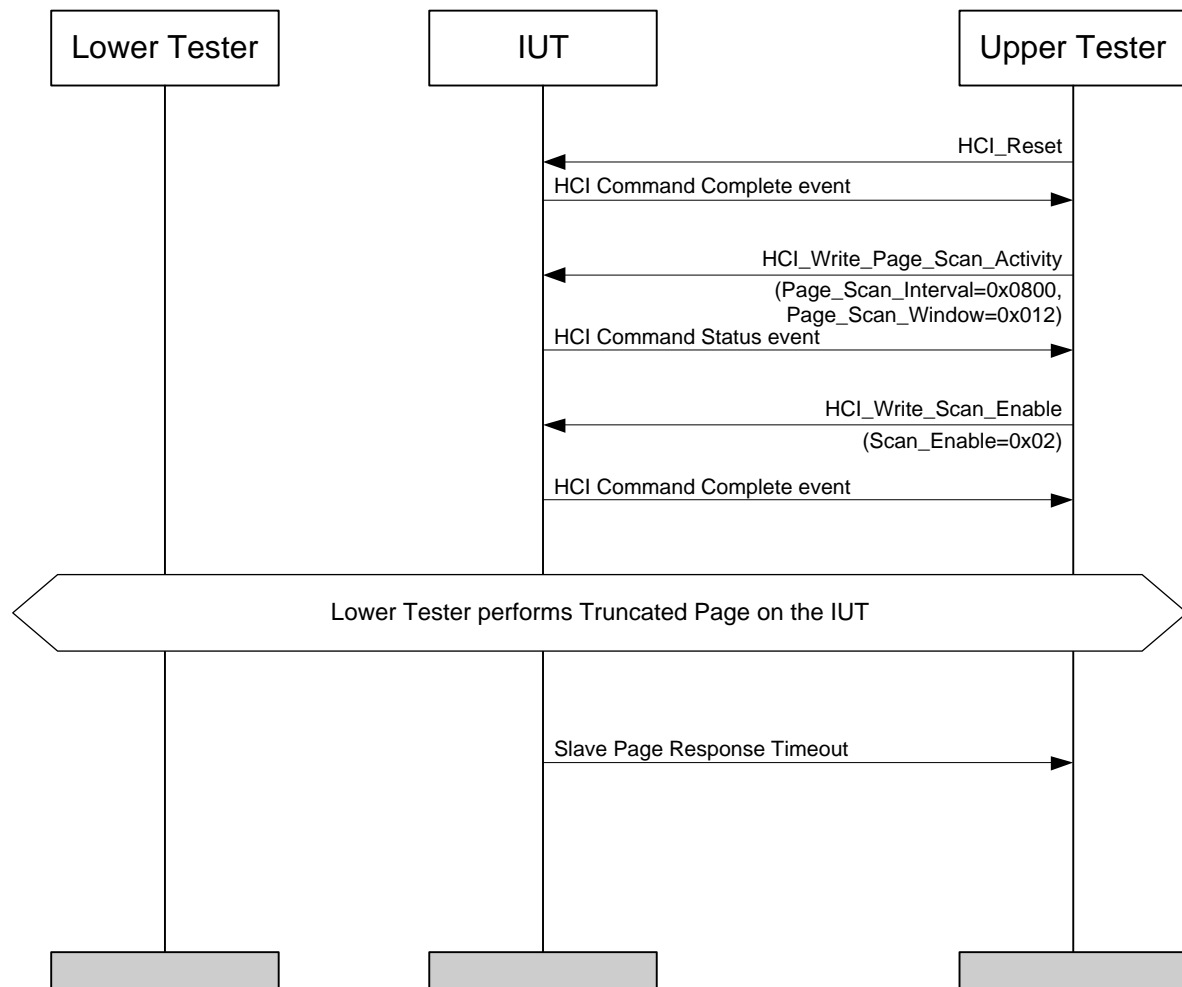


Figure 4.75: HCI/CSE/BV-07-C

- Expected Outcome

Pass Verdict

The IUT generates a Page Response Timeout event.

4.11 Connectionless Slave Broadcast

Test group objectives

- To verify the correct implementation of Connectionless Slave Broadcast commands and events
- To verify the correct implementation of Synchronization Train commands and events
- To verify the correct implementation of Truncated Page commands and events

4.11.1 HCI/CSB/BV-01-C [Connectionless Slave Broadcast Transmission]

- Test Purpose

Verify that:

- Set Reserved *LT_ADDR* command reserves the correct *LT_ADDR* on the IUT for Connectionless Broadcast.
- The Write Synchronization Train Parameters command configures Synchronization Train parameters on the IUT.
- The Read Synchronization Train Parameters command retrieves previously configured Synchronization Train parameters from the IUT.
- The Set Connectionless Slave Broadcast Data command correctly configures the IUT to transmit the provided data.
- The Set Connectionless Slave Broadcast command correctly configures the IUT to transmit Connectionless Broadcast packets.
- The Start Synchronization Train command starts the Synchronization Train on the IUT.
- The IUT sends a Synchronization Train Complete event to the Upper Tester after the Synchronization train completes after the configured time.

- Reference

[1] 7.1, 7.3, 7.7

- Initial Condition

IUT is in Standby.

- Test Procedure

1. Upper Tester sends HCI Set Reserved *LT_ADDR* command to the IUT and expects HCI Command Complete with Status = Success
2. Upper Tester sends HCI Write Synchronization Train parameters and expects HCI Command Complete with Status = Success
3. Upper Tester sends HCI Read Synchronization Train parameters and expects HCI Command Complete with Status = Success and Synchronization Train parameters that match the values set in step 2
4. Upper Tester sends HCI Set Connectionless Broadcast Data command to the IUT and expects HCI Command Complete with Status = Success
5. Upper Tester sends HCI Set Connectionless Broadcast command to the IUT and expects HCI Command Complete with Status = Success
6. Upper Tester sends HCI Start Synchronization Train command to the IUT and expects HCI Command Complete with Status = Success

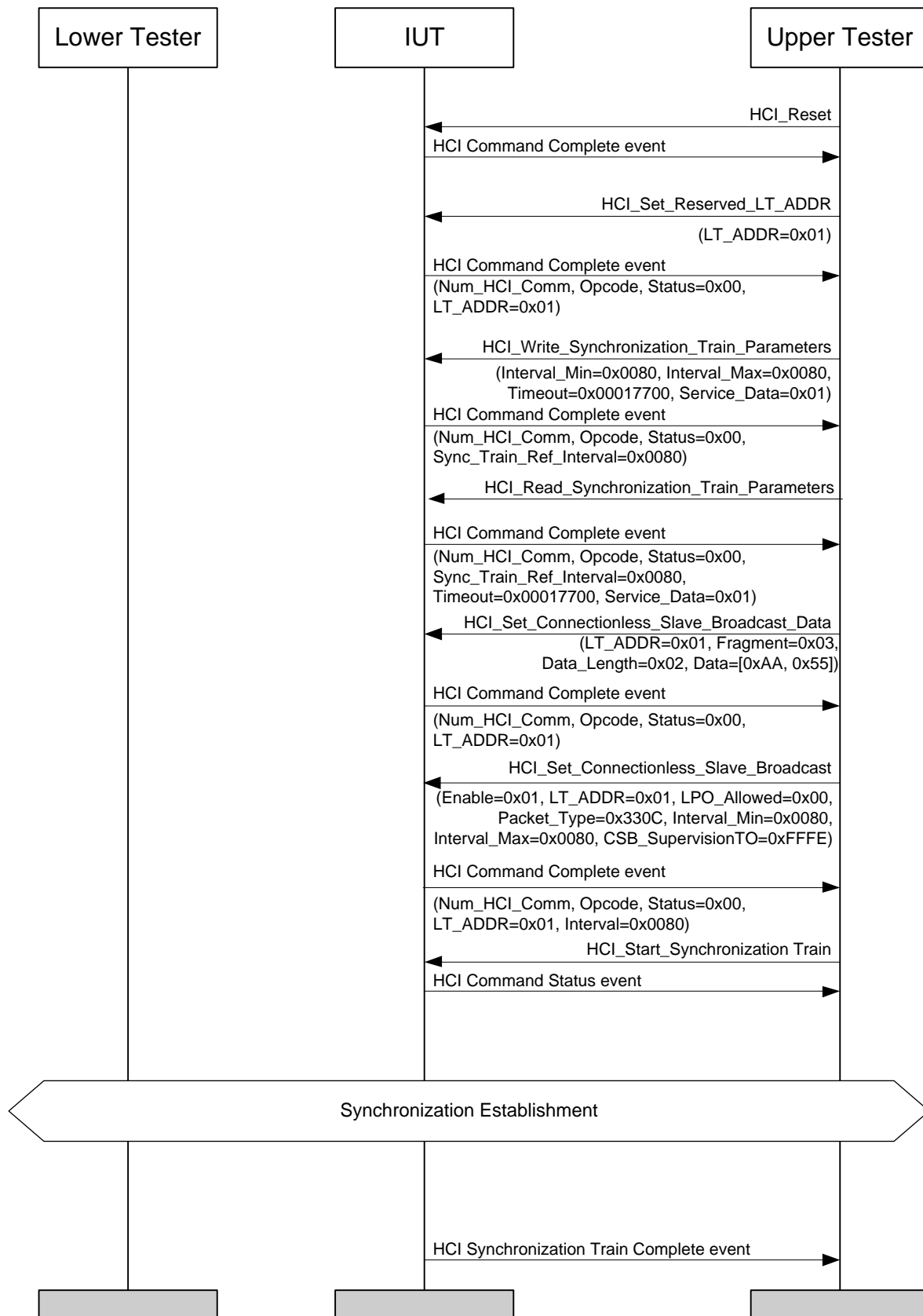


Figure 4.76: HCI/CSB/BV-01-C Connectionless Slave Broadcast Transmission

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the Set Reserved LT ADDR command AND

The IUT returns 'command complete' succeeded to the Write Synchronization Train Parameters command AND

The IUT returns 'command complete' succeeded with the previously configured Synchronization Train parameters as a result of the Read Synchronization Train Parameters command AND

The IUT returns 'command complete' succeeded to the Set Connectionless Slave Broadcast Data command AND

The IUT returns 'command complete' succeeded to the Set Connectionless Slave Broadcast command AND

The IUT returns 'command status' pending to the Start Synchronization Train command AND

The Lower Tester successfully synchronizes to the IUT AND

The Lower Tester successfully receives broadcast data AND

The IUT returns 'synchronization train complete' event after the configured Synchronization Train duration.

4.11.2 HCI/CSB/BV-02-C [Delete Reserved LT ADDR]

- Test Purpose

Verify that the Delete Reserved LT ADDR command cancels the reservation of a specific LT_ADDR

- Reference

[1] 7.3

- Initial Condition

IUT is in Standby.

- Test Procedure

Upper Tester sends HCI Set Reserved LT_ADDR command to the IUT and expects HCI Command Complete with Status = Success.

Upper Tester sends HCI Delete Reserved LT_ADDR command and expects HCI Command Complete with Status = Success.

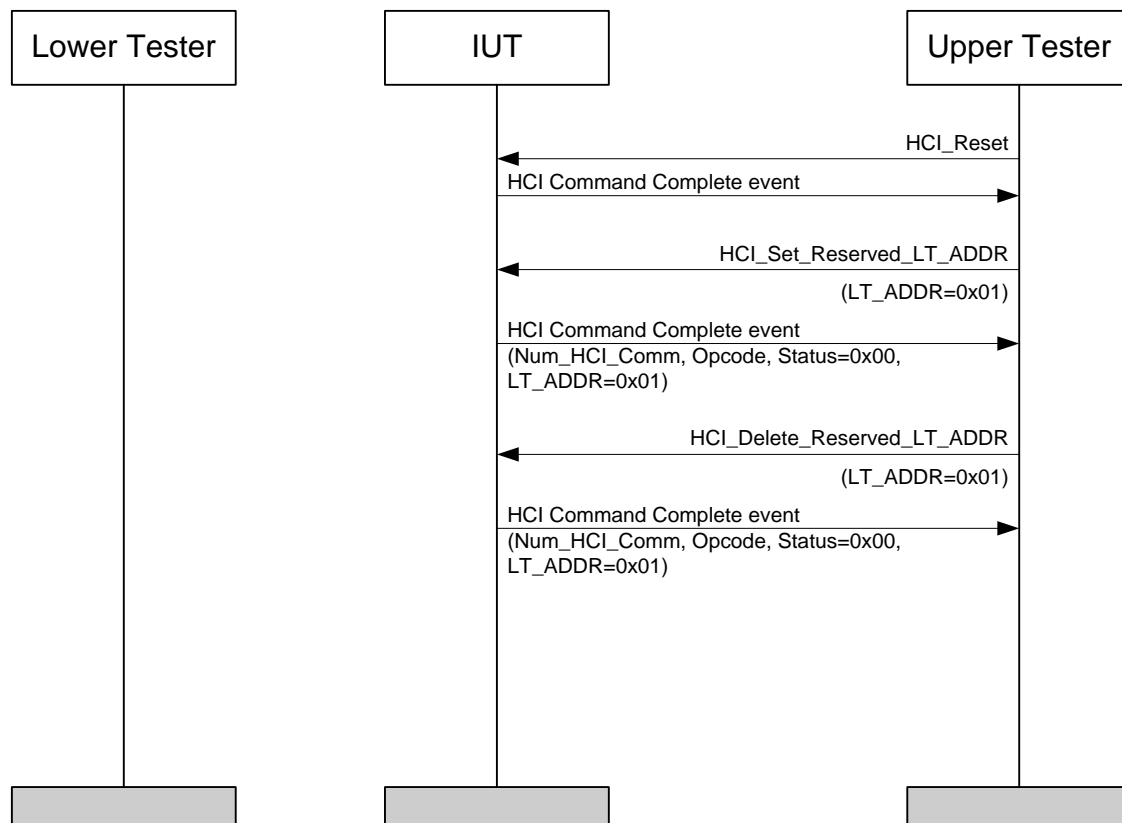


Figure 4.77: HCI/CSB/BV-02-C

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the Set Reserved LT_ADDR command AND

The IUT returns 'command complete' succeeded to the Delete Reserved LT_ADDR command.

4.11.3 HCI/CSB/BV-03-C [CSB Channel Map Change Event]

- Test Purpose

Verify that the IUT generates a Connectionless Slave Broadcast Channel Map Change event when the channel map for Connectionless Slave Broadcast changes.

- Reference

[1] 7.7

- Initial Condition

IUT is in Standby.

- Test Procedure

Upper Tester sends HCI Set Reserved LT_ADDR command to the IUT and expects HCI Command Complete with Status = Success.

Upper Tester sends HCI Write Synchronization Train parameters and expects HCI Command Complete with Status = Success.

Upper Tester sends Set AFH Host Channel Classification command and expects HCI Command Complete with Status = Success.

Upper Tester sends HCI Set Connectionless Broadcast command to the IUT and expects HCI Command Complete with Status = Success.

Upper Tester sends Set AFH Host Channel Classification command and expects HCI Command Complete with Status = Success.

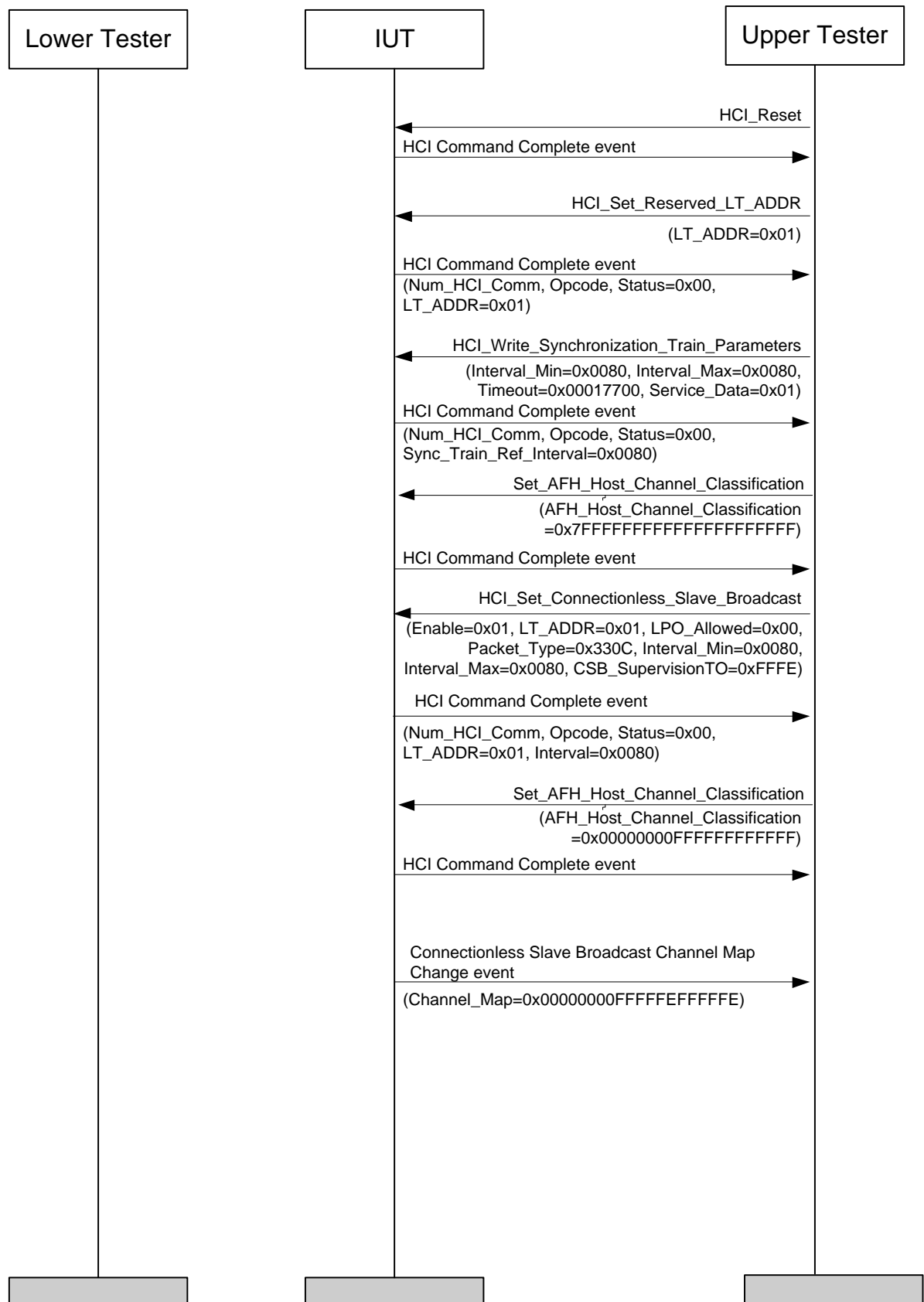


Figure 4.78: HCI/CSB/BV-03-C

- Expected Outcome

Pass Verdict

The IUT returns 'command complete' succeeded to the Set Reserved LT ADDR command AND

The IUT returns 'command complete' succeeded to the Write Synchronization Train Parameters command AND

The IUT returns 'command complete' succeeded to the Set AFH Host Channel Classification command AND

The IUT returns 'command complete' succeeded to the Set Connectionless Slave Broadcast command AND

The IUT returns 'command complete' succeeded to the Set AFH Host Channel Classification command AND

The IUT generate a Connectionless Slave Broadcast Channel Map change event with the channel map from the previous Set AFH Host Channel Classification command.

4.11.4 HCI/CSB/BV-04-C [Connectionless Slave Broadcast Reception]

- Test Purpose

Verify that:

- a) The Receive Synchronization Train command configures the IUT to receive Synchronization Train.
- b) The IUT generates Synchronization Train Received events.
- c) The Set Connectionless Slave Broadcast Receive command configures the IUT to receive Connectionless Slave Broadcast packets.
- d) The IUT generates Connectionless Broadcast Receive events.

- Reference

[1] 7.1, 7.3, 7.7

- Initial Condition

IUT is in Standby.

Lower Tester is transmitting Connectionless Slave Broadcast packets using the following parameters:

LT_ADDR: 1

LPO_Allowed: 0 (No)

Packet_Type: 0x330E (only DM1 packets allowed)

Interval: 0x0080 (80 ms)



Data_Length = 0x02

Data = [0xAA, 0x55]

Lower Tester is transmitting Synchronization Train continuously with an interval of 0x0080.

- Test Procedure

Upper Tester sends HCI Receive Synchronization Train command to the IUT and expects HCI Command Status pending.

IUT generates a Synchronization Train Received event.

Upper Tester uses the parameters from the Synchronization Train Received event to send the HCI Set Connectionless Broadcast Receive command and expects HCI Command Complete with Status = Success.

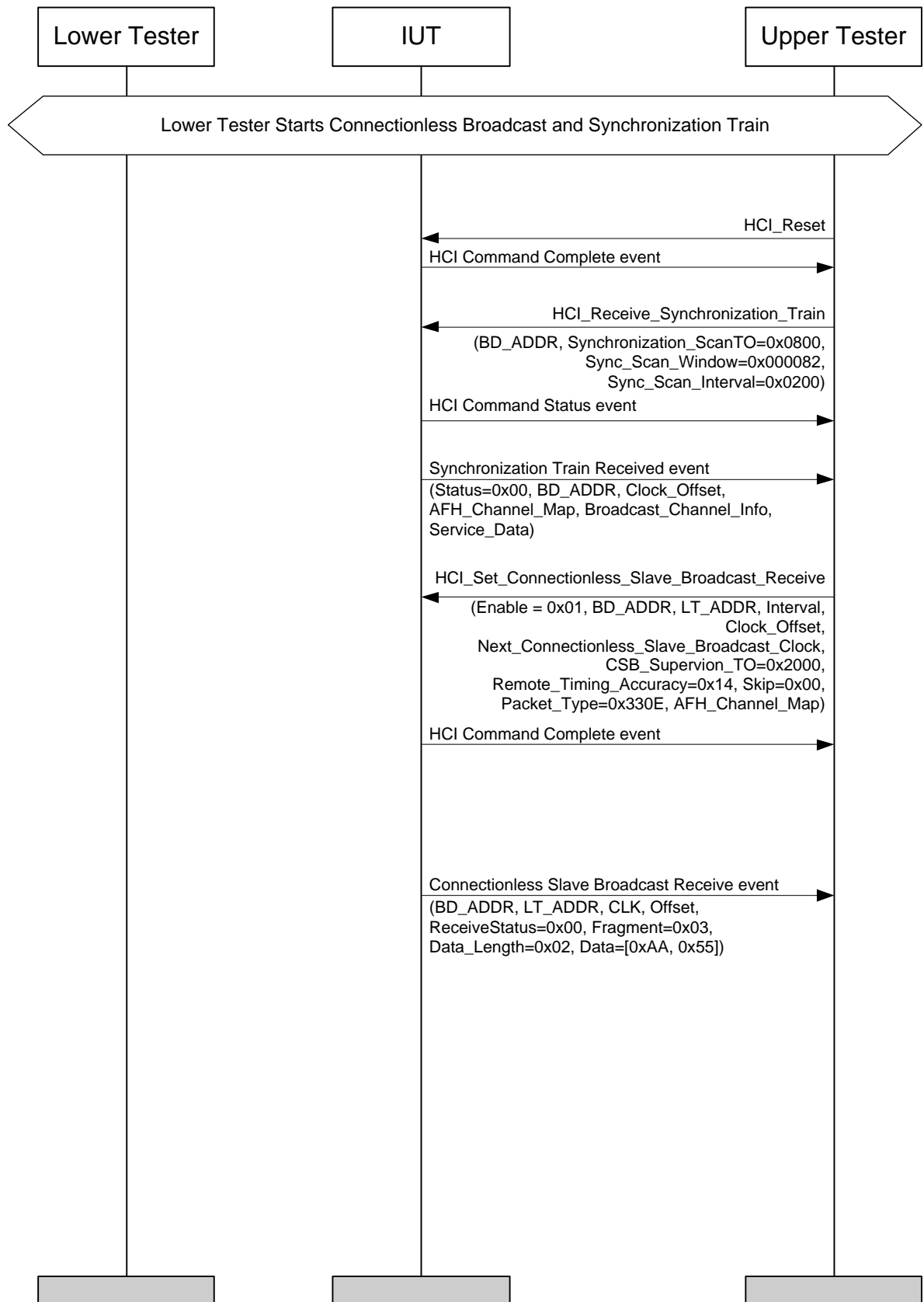


Figure 4.79: HCI/CSB/BV-04-C

- Expected Outcome

Pass Verdict

The IUT returns 'command status' pending to the Receive Synchronization Train command AND

The IUT generates a Synchronization Train Received event AND

The IUT generates Connectionless Slave Broadcast Receive events with data transmitted by the Lower Tester.

4.11.5 HCI/CSB/BV-05-C [Connectionless Slave Broadcast Reception Timeout]

- Test Purpose

Verify that the IUT generates Connectionless Slave Broadcast Timeout event.

- Reference

[1] 7.7

- Initial Condition

IUT is in Standby.

Lower Tester is transmitting Connectionless Slave Broadcast packets using the following parameters:

LT_ADDR: 1

LPO_Allowed: 0 (No)

Packet_Type: 0x330E (only DM1 packets allowed)

Interval: 0x0080 (80 ms)

Data_Length = 0x02

Data = [0xAA, 0x55]

Lower Tester is transmitting Synchronization Train continuously with an interval of 0x0080.

- Test Procedure

Upper Tester sends HCI Receive Synchronization Train command to the IUT and expects HCI Command Status pending.

IUT generates a Synchronization Train Received event.

Upper Tester uses the parameters from the Synchronization Train Received event to send the HCI Set Connectionless Broadcast Receive command and expects HCI Command Complete with Status = Success.

IUT generates Connectionless Slave Broadcast Receive events.

Stop Connectionless Slave Broadcast from Lower Tester.



IUT generates Connectionless Slave Broadcast Timeout after the configured timeout period has expired.

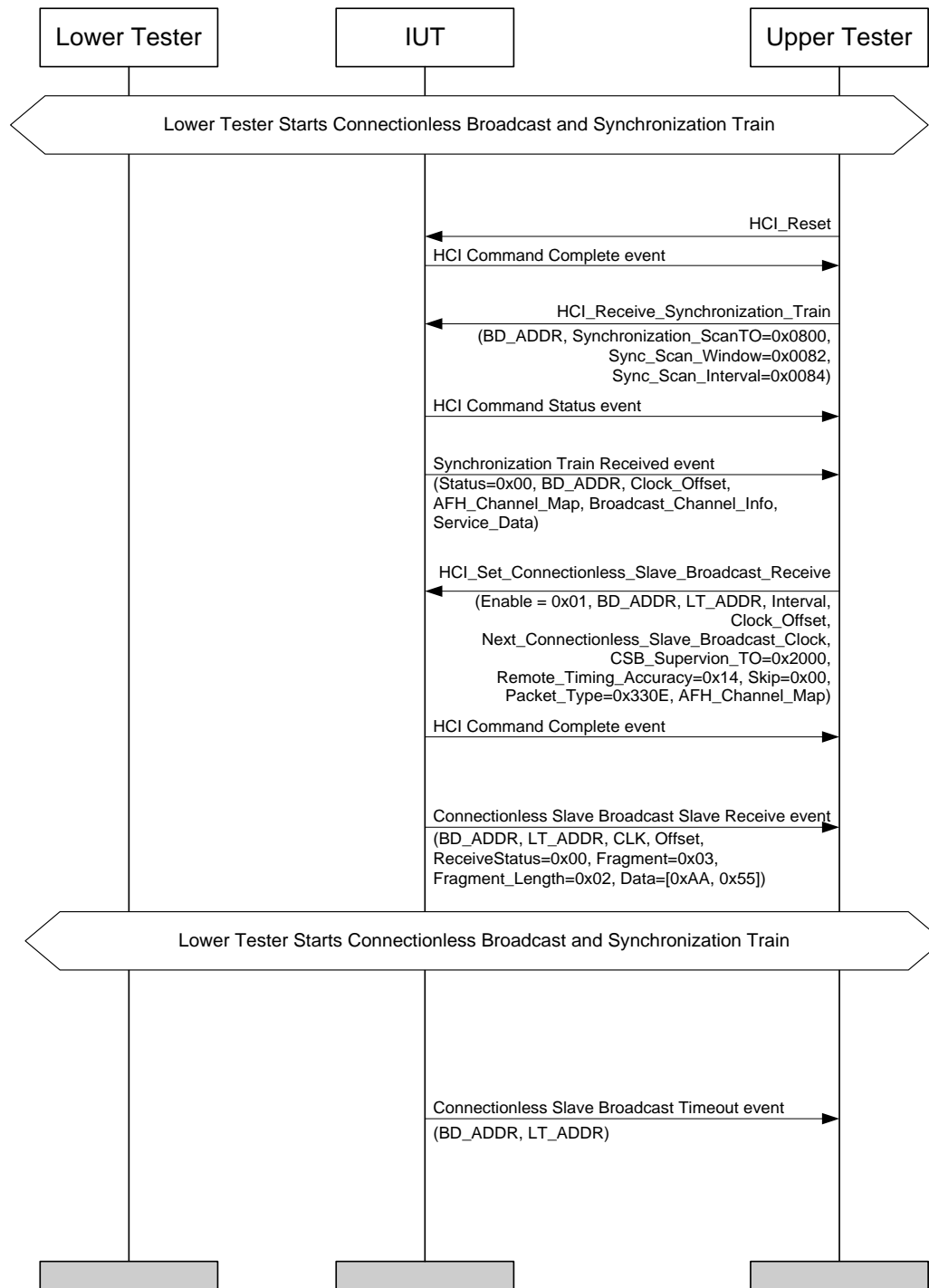


Figure 4.80: HCI/CSB/BV-05-C

- Expected Outcome

Pass Verdict

The IUT generates Connectionless Slave Broadcast Timeout event.

4.12 LE Connection Management

4.12.1 HCI/CM/BV-01-C [LE Read Peer Resolvable Address Command – Master]

- Test Purpose

Verify that the IUT correctly handles the LE Read Peer Resolvable Address Command.

- Reference

[2] 7.8.42

- Initial Condition

IUT is Master.

- Test Procedure

The Upper Tester populates the resolving list with the device identity of the Lower Tester, and its own device identity. The IUT uses this when generating a resolvable private address for the connection establishment.

Upper Tester enables resolving list.

Configure Lower Tester to initiate a connection while using directed advertisement with resolvable private addresses.

Upper Tester commands the IUT to create a connection to the Lower Tester.

The IUT sends an LE Enhanced Connection Complete Event.

The Upper Tester issues a LE Read Peer Resolvable Address Command, with the identity address of the Lower Tester.

Upper Tester receives a Command Complete event from the IUT for the LE Read Peer Resolvable Address Command with the Lower Tester's resolvable address.

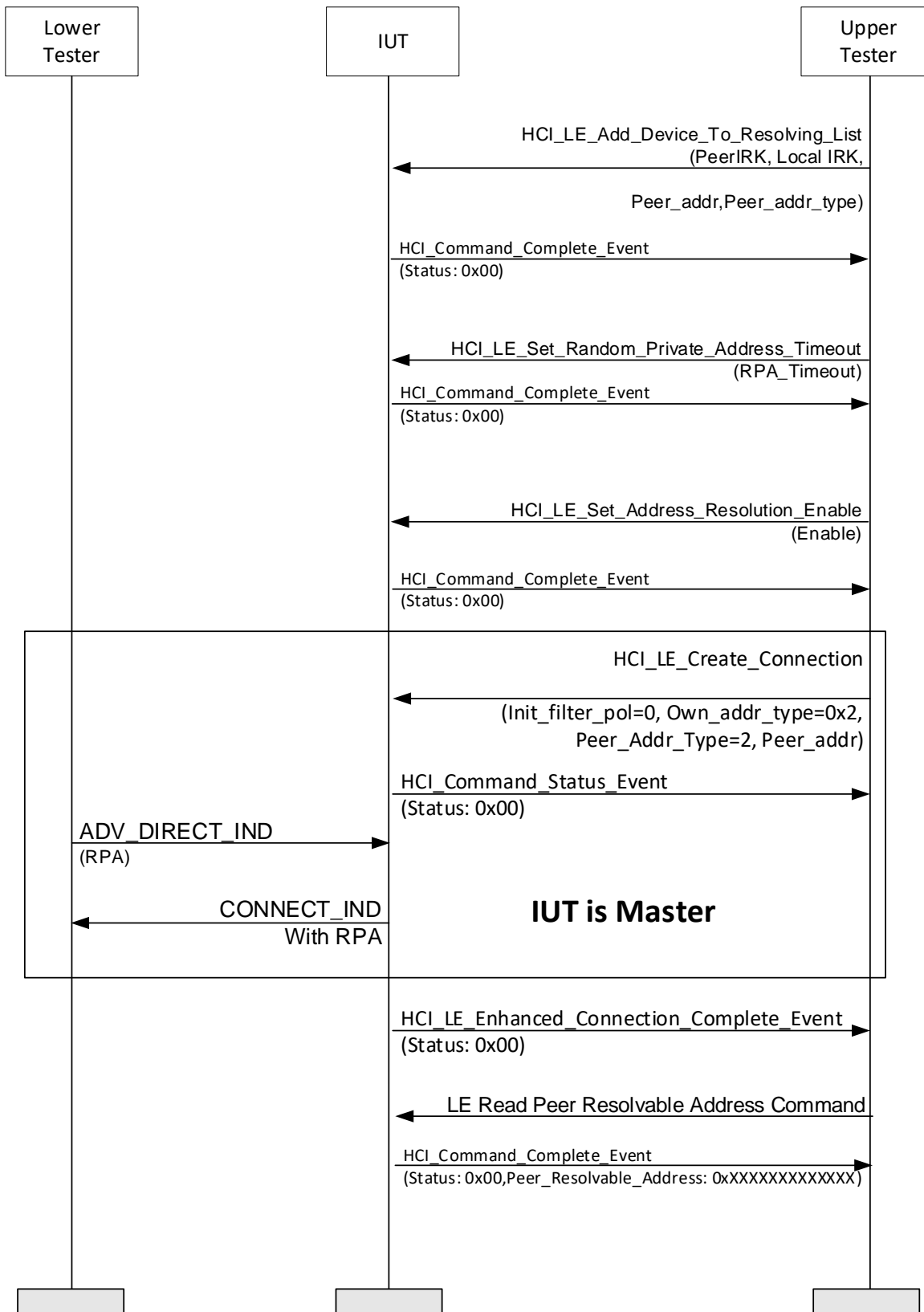


Figure 4.81: HCI/CM/BV-01-C: LE Read Peer Resolvable Address Command – Master

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status=0x00 (Success) and Peer_resolvable_address= 0XXXXXXXXXXXXX

The received resolvable address is identical with the Peer_Resolvable_Private_Address received in the enhanced connection complete event.

4.12.2 HCI/CM/BV-02-C [LE Read Local Resolvable Address Command – Master]

- Test Purpose

Verify that the IUT correctly handles the LE Read Local Resolvable Address Command

- Reference

[2] 7.8.43

- Initial Condition

IUT is Master.

- Test Procedure

The Upper Tester populates the resolving list with the device identity of the Lower Tester, and its own device identity. The IUT uses this when generating a resolvable private address for the connection establishment.

Upper Tester enables resolving list.

Configure Lower Tester to initiate a connection while using directed advertisement with resolvable private addresses.

Upper Tester command the IUT to create a connection to the Lower Tester.

The IUT sends an LE Enhanced Connection Complete Event.

The Upper Tester issues a LE Local Peer Resolvable Address Command, with the identity address of the Lower Tester.

Upper Tester receives a Command Complete event from the IUT for the LE Local Peer Resolvable Address Command with the local resolvable address.

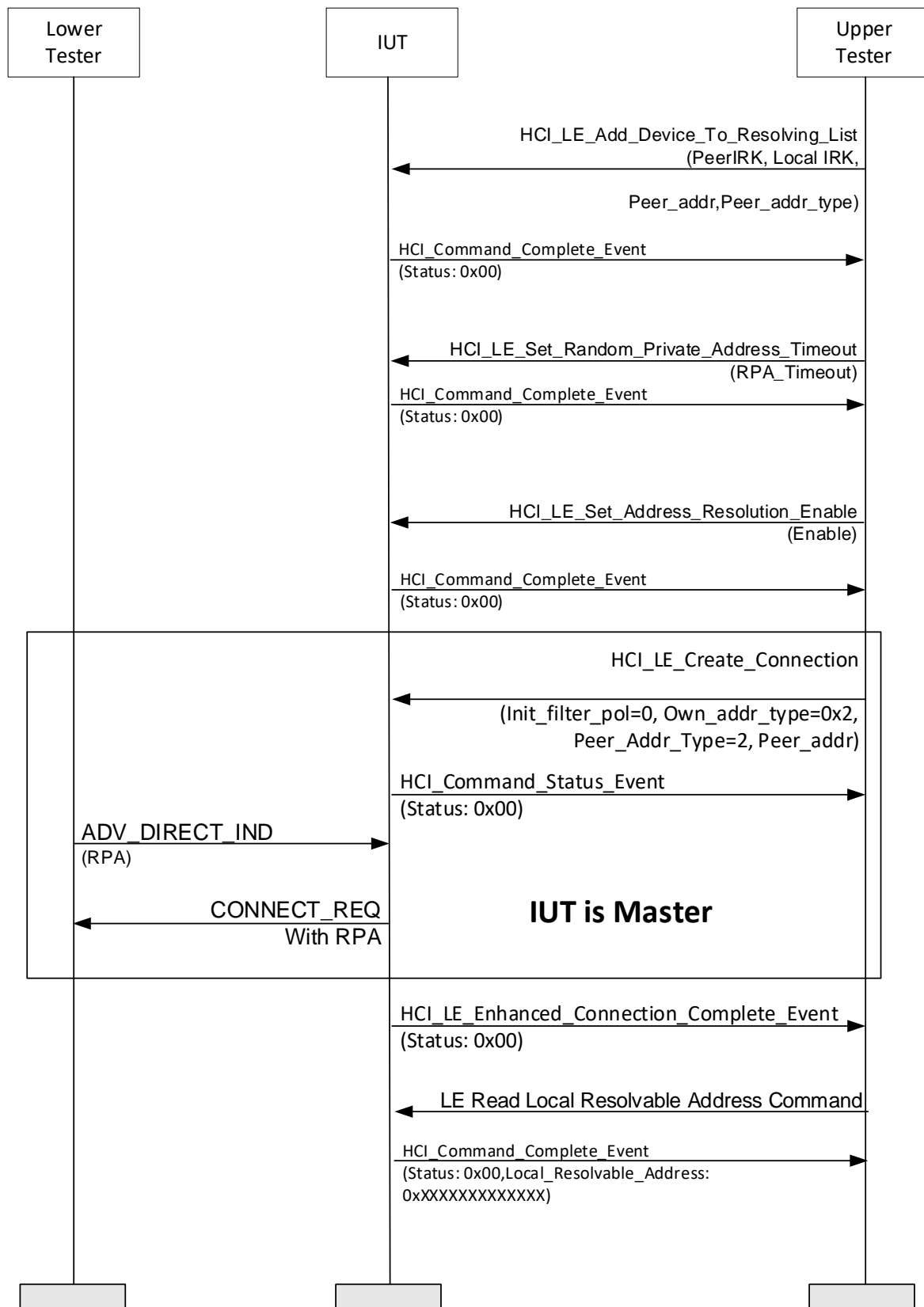


Figure 4.82: HCI/CM/BV-02-C: LE Read Local Resolvable Address Command – Master

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status=0x00 (Success) and Local_Resolvable_Address= 0xFFFFFFFFXXXX

The received resolvable address is identical with the Local_Resolvable_Private_Address received in the enhanced connection complete event.

4.12.3 HCI/CM/BV-03-C [LE Read PHY Command]

- Test Purpose

Verify that the IUT correctly handles the LE Read PHY Command.

- Reference

[9] 7.8.47

- Initial Condition

LL connection established, IUT is Master or Slave.

- Test Procedure

Upper Tester issues an LE Read PHY command to the IUT containing the current connection handle.

Upper Tester receives a Command Complete event from the IUT for the LE Read PHY command containing the connection handle and with values for TX_PHY and RX_PHY that match the current PHY for the active connection.

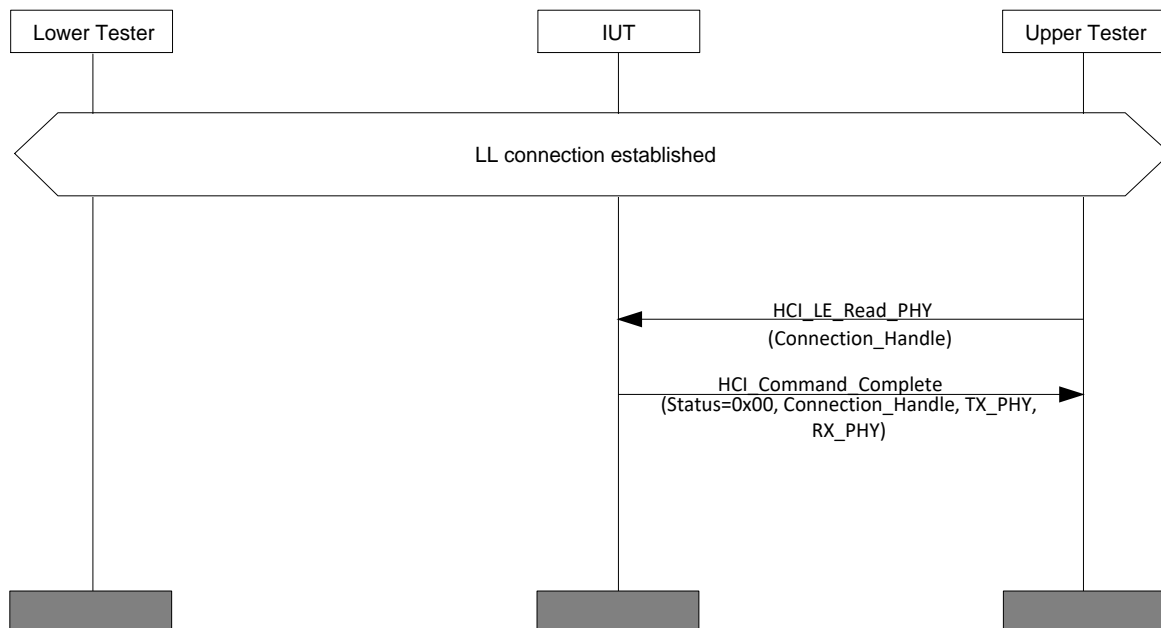


Figure 4.83: HCI/CM/BV-03-C: LE Read PHY Command

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status = 0x00 (Success) and with the value for Connection_Handle matching the value sent in the LE Read PHY Command.

The TX_PHY and RX_PHY fields contain values which match the PHY selected for the current active connection.

4.12.4 HCI/CM/BV-04-C [Extended Scanning with Device Privacy, RPA Timeout During Connection Initiation]

- Test Purpose

Tests that when the IUT is initiator and an RPA Timeout occurs between the IUT issuing an AUX_CONNECT_REQ PDU and the Lower Tester responding with a AUX_CONNECT_RSP PDU, that the HCI_LE_Enhanced_Connection_Complete_Event returns the latest Peer_Address, Peer_Resolvable_Private_Address and Local_Resolvable_Private_Address sent and received over the air.

- Reference

[12] Section 7.7.65.10

- Initial Condition

The Lower Tester has previously distributed its IRK to the IUT.

The IUT has previously distributed its IRK to the Lower Tester.

The Lower Tester has added the IUT to its resolving list and sets the entry for device privacy mode.

The IUT has added the Lower Tester to its resolving list and sets the entry for device privacy mode.

Device privacy mode is enabled on IUT and Lower Tester.

The Lower Tester is using its Identity Address in the AdvA field of the advertisement packets.

- Test Procedure

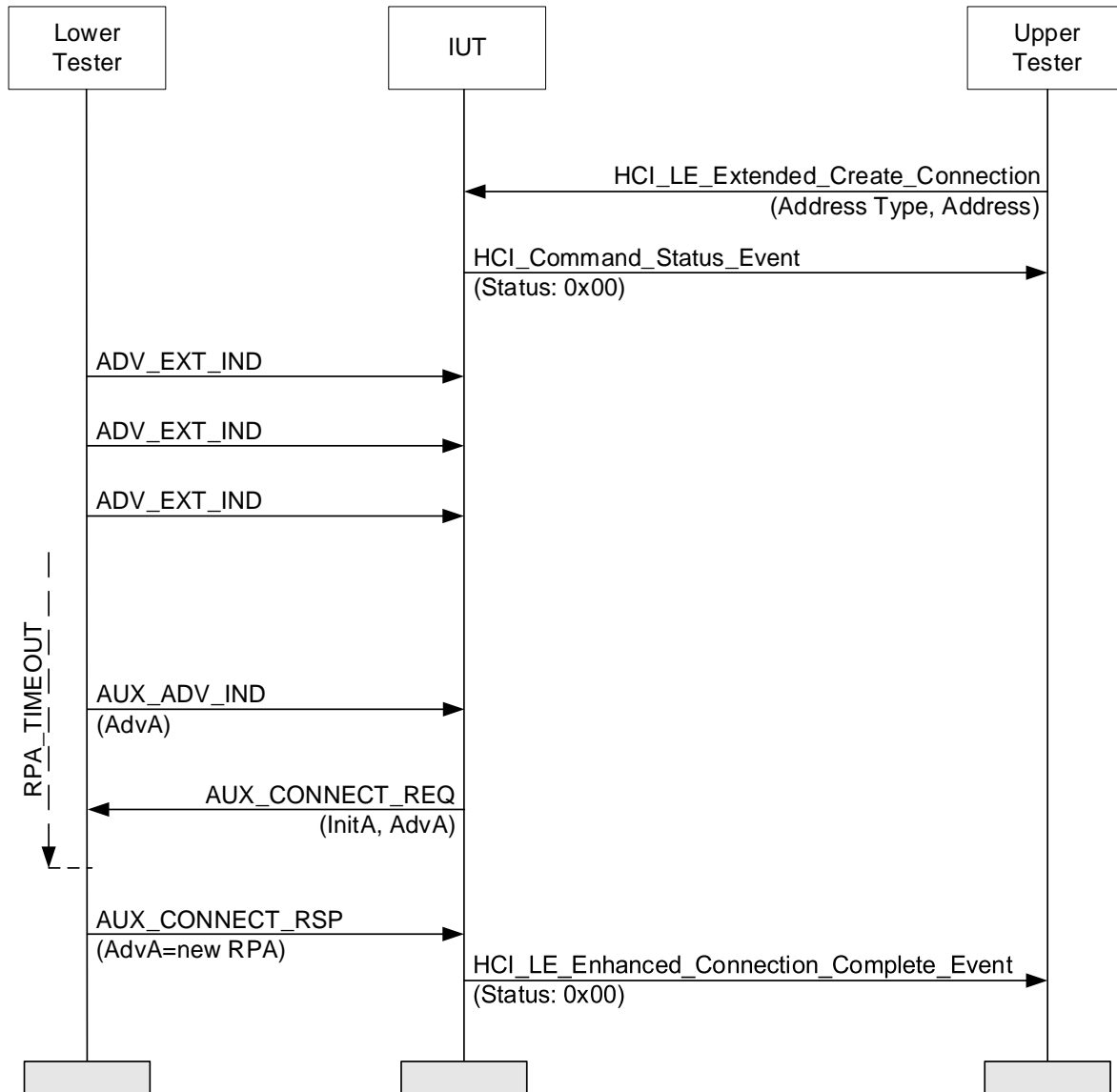


Figure 4.84: HCI/CM/BV-04-C [Extended Scanning with Device Privacy, RPA Timeout During Connection Initiation]

1. The Upper Tester sends an HCI_LE_Extended_Create_Connection command to the IUT. The peer address and address type shall be set to the ones used by the Lower Tester. The Upper Tester expects an HCI_Command_Status event in response.
2. The Lower Tester begins advertising using the ADV_EXT_IND PDU with the AuxPtr field referencing the AUX_ADV_IND.
3. The Lower Tester expects an AUX_CONNECT_REQ PDU on the secondary advertising channel after sending any of the AUX_ADV_IND PDUs.
4. An RPA Timeout is simulated on the Lower Tester.
5. The Lower Tester sends an AUX_CONNECT_RSP PDU to the IUT on the secondary advertising channel with a new RPA.
6. The Upper Tester expects an HCI_LE_Enhanced_Connection_Complete event from the IUT.

- Expected Outcome

Pass Verdict

The test procedure completes with the IUT establishing a connection with the Lower Tester.

The HCI_LE_Enhanced_Connection_Complete_Event returns the latest Peer_Address, Peer_Resolvable_Private_Address and Local_Resolvable_Private_Address sent and received over the air.

4.12.5 HCI/CM/BV-05-C [LE Read Peer Resolvable Address Command – Slave]

- Test Purpose

Verify that the IUT correctly handles the LE Read Peer Resolvable Address Command.

- Reference

[2] 7.8.42

- Initial Condition

IUT is Slave.

- Test Procedure

The Upper Tester populates the resolving list with the device identity of the Lower Tester, and its own device identity. The IUT uses this when generating a resolvable private address for the connection establishment.

Upper Tester enables resolving list.

Configure Lower Tester to initiate a connection while using resolvable private addresses.

Upper Tester enables resolving list and directed connectable advertising in the IUT.

The IUT sends an LE Enhanced Connection Complete Event.

The Upper Tester issues a LE Read Peer Resolvable Address Command, with the identity address of the Lower Tester.

Upper Tester receives a Command Complete event from the IUT for the LE Read Peer Resolvable Address Command with the Lower Tester's resolvable address.

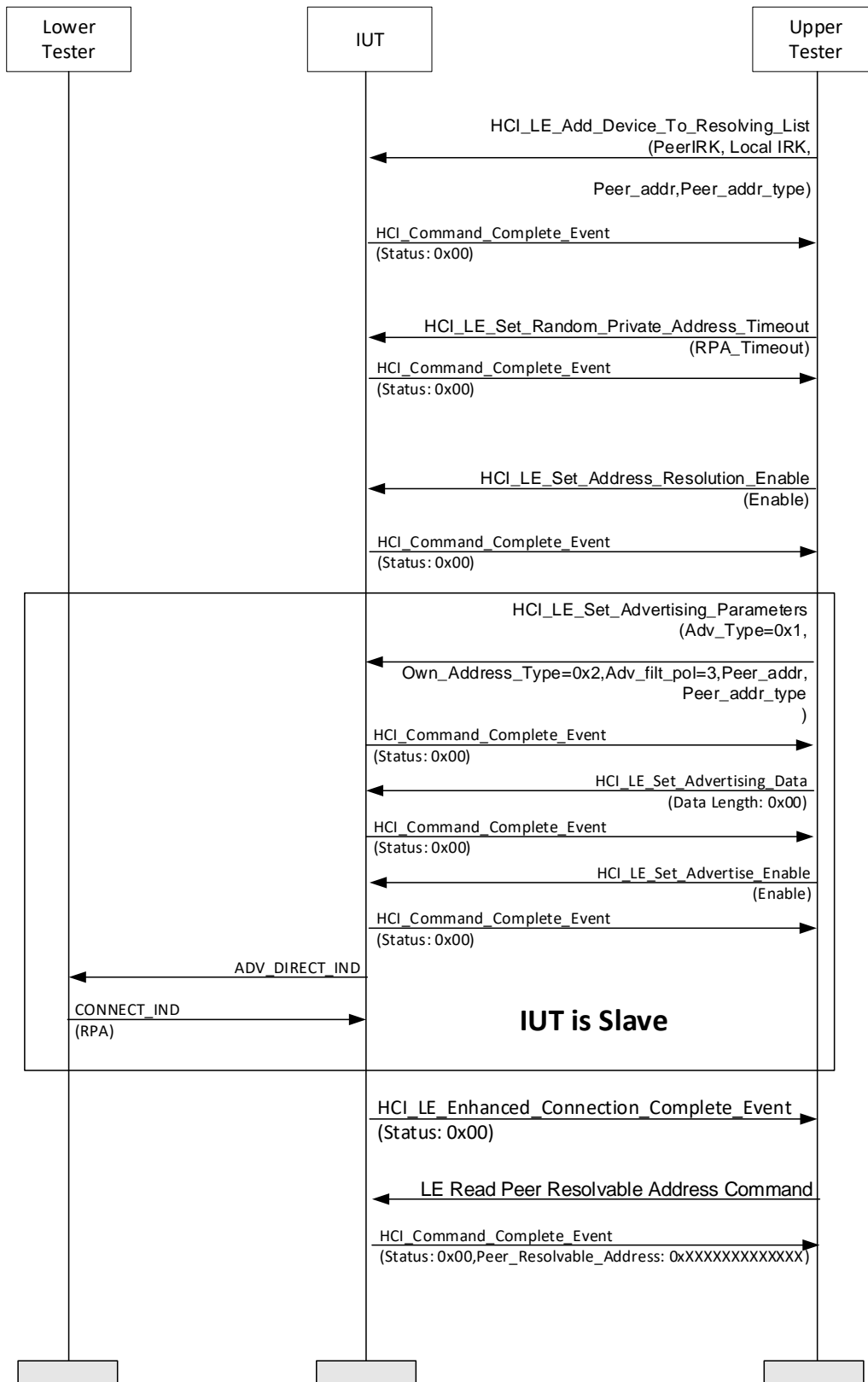


Figure 4.85: HCI/CM/BV-05-C: [LE Read Peer Resolvable Address Command – Slave]

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status=0x00 (Success) and Peer_resolvable_address.= 0XXXXXXXXXXXXX

The received resolvable address is identical with the Peer_Resolvable_Private_Address received in the enhanced connection complete event.

4.12.6 HCI/CM/BV-06-C [LE Read Local Resolvable Address Command – Slave]

- Test Purpose

Verify that the IUT correctly handles the LE Read Local Resolvable Address Command

- Reference

[2] 7.8.43

- Initial Condition

IUT is Slave.

- Test Procedure

The Upper Tester populates the resolving list with the device identity of the Lower Tester, and its own device identity. The IUT uses this when generating a resolvable private address for the connection establishment.

Upper Tester enables resolving list.

Configure Lower Tester to initiate a connection while using resolvable private addresses.

Upper Tester enables resolving list and directed connectable advertising in the IUT.

The IUT sends an LE Enhanced Connection Complete Event.

The Upper Tester issues a LE Local Peer Resolvable Address Command, with the identity address of the Lower Tester.

Upper Tester receives a Command Complete event from the IUT for the LE Local Peer Resolvable Address Command with the local resolvable address.

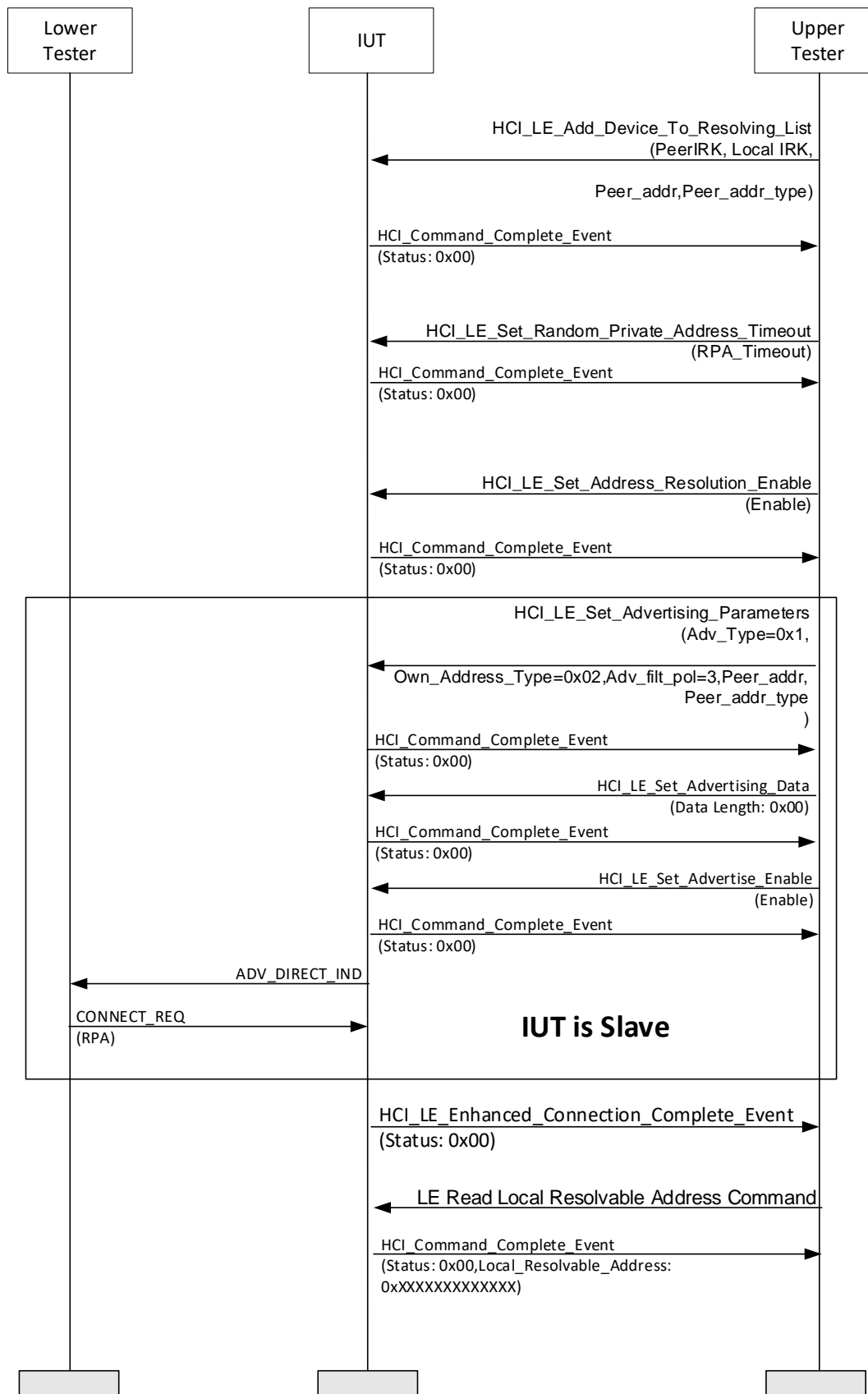


Figure 4.86: HCI/CM/BV-06-C: [LE Read Local Resolvable Address Command – Slave]

- Expected Outcome

Pass Verdict

Upper Tester receives a Command Complete event from the IUT with Status=0x00 (Success) and Local_Resolvable_Address.= 0XXXXXXXXXXXXX

The received resolvable address is identical with the Local_Resolvable_Private_Address received in the enhanced connection complete event.

4.12.7 HCI/CM/BI-01-C [LE Extended Create Connection With Unsupported PHY]

- Test Purpose

Verify that the IUT properly rejects an HCI_LE_Extended_Create_Connection command that specifies unsupported PHYs.

- Reference

[9] 7.8.66

- Initial Conditions

IUT is not currently connected.

- Test Procedure

For each bit on the Initiating_PHYs parameter of the HCI_LE_Extended_Create_Connection command that is an RFU bit or corresponds to a PHY not supported by the IUT:

Upper Tester sends an HCI_LE_Extended_Create_Connection command to IUT with Initiating_PHYs having only that bit set and expects an HCI_Command_Complete event with a non-zero status.

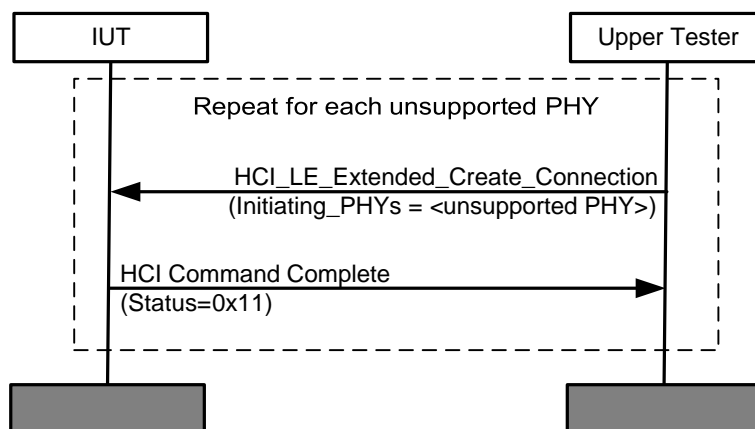


Figure 4.87: HCI/CM/BI-01-C [LE Extended Create Connection With Unsupported PHY]

- Expected Outcome

If the IUT supports PHYs corresponding to all 8 bits of the Initiating_PHYs parameter, the test procedure will do nothing. This case is a Pass.

Pass Verdict

Command Complete event for HCI_LE_Extended_Create_Connection is received by the Upper Tester with the error code Unsupported Feature or Parameter Value (0x11).

5 Test Case Mapping

5.1 Test Case Mapping

The Test Case Mapping Table (TCMT) maps test cases to specific capabilities in the ICS. Profiles, protocols and services may define multiple roles, and it is possible that a product may implement more than one role. The product shall be tested in all roles for which support is declared in the ICS document.

The columns for the TCMT are defined as follows:

Item: contains a y/x reference, where y corresponds to the table number and x corresponds to the feature number as defined in the HCI ICS Proforma [2]. If the item is defined with Protocol, Profile or Service abbreviation before y/x, the table and feature number referenced are defined in the abbreviated ICS proforma document.

Feature: recommended to be the primary feature defined in the ICS being tested or may be the test case name.

Test Case(s): the applicable test case identifiers required for Bluetooth Qualification if the corresponding y/x references defined in the Item column are supported.

Unless otherwise noted, test cases are defined in this document. Test cases starting with “BB/” are defined in [4]; test cases starting with “LMP/” are defined in [5]. Test cases starting with “80211PAL/” are defined in [6]. Test cases starting with “LL/” are defined in [7].

Item	Feature	Test Case
Device Setup		
(HCI 1a/1 AND NOT HCI 1/1b) OR (HCI 1a/3 AND NOT HCI 1/1c) OR (HCI 1a/4 AND NOT HCI 1/1d)	Command Complete Event on each supported controller	HCI/GEV/BV-01-C
LL 3/9	Extended Advertising Extended Scanning	HCI/GEV/BV-02-C HCI/GEV/BV-04-C
LL 4/7	Extended Scanning	HCI/GEV/BV-03-C
HCI 1a/1	Reset Command	HCI/DSU/BV-01-C
LL 1/1 AND HCI 1a/4	Reset Command	HCI/DSU/BV-02-C
LL 1/4 AND HCI 1a/4	Reset Command	HCI/DSU/BV-03-C
LL 1/2 AND HCI 1a/4	Reset Command	HCI/DSU/BV-04--C
LL 1/3 AND HCI 1a/4	Reset Command	HCI/DSU/BV-05-C
LL 1/5 AND HCI 1a/4	Reset Command	HCI/DSU/BV-06-C

Item	Feature	Test Case
HCI 1a/3	Reset Command	HCI/DSU/BV-07-C
Controller Flow Control		
HCI 3/1	Read Buffer Size Command	HCI/CFC/BV-01-C
HCI 3/5	LE Read Buffer Size Command	HCI/CFC/BV-02-C
Controller Information		
HCI 4/2	Read Local Supported Commands Command	HCI/CIN/BV-03-C
(HCI 1a/1 OR HCI 1a/3) AND HCI 4/3	Read Local Supported Features Command	HCI/CIN/BV-01-C
(HCI 1a/1 OR HCI 1a/3) AND HCI 4/4	Read Local Extended Features Command	HCI/CIN/BV-02-C
HCI 4/1	Read Local Version Information Command	HCI/CIN/BV-04-C
HCI 1a/4	LE White List	HCI/CIN/BV-06-C
HCI 4/12	Read Local Simple Pairing Options Command	HCI/CIN/BV-08-C
Controller Configuration		
HCI 5/27 OR HCI 5/28 OR HCI 5/29 OR HCI 5/30	LE Resolving List Management	HCI/CCO/BV-12-C HCI/CCO/BV-13-C HCI/CCO/BV-14-C
HCI 13/10	LE Set Default PHY Command	HCI/CCO/BV-15-C
HCI 14/17 AND HCI 14/18 AND HCI 14/19	LE Add Device To Periodic Advertiser List Command, LE Remove Device From Periodic Advertiser List Command, LE Clear Periodic Advertiser List Command	HCI/CCO/BV-17-C
HCI 14/20	LE Read Periodic Advertiser List Size Command	HCI/CCO/BV-16-C
HCI 5/44	LE Read Transmit Power Command	HCI/CCO/BV-18-C
HCI 5/45	LE Write RF Path Compensation Command	HCI/CCO/BV-19-C
HCI 5/46	LE Read RF Path Compensation Command	HCI/CCO/BV-20-C

Item	Feature	Test Case
LL 9/13 AND LL 1/1	LE Resolving List and Advertising	HCI/CCO/BI-01-C
LL 9/13 AND LL 1/2	LE Resolving List and Scanning	HCI/CCO/BI-02-C
LL 9/13 AND LL 1/3 AND HCI 7/23	LE Resolving List and Create Connection	HCI/CCO/BI-03-C
LL 9/13 AND LL 1/3 AND HCI 7/41	LE Resolving List and Extended Create Connection	HCI/CCO/BI-04-C
LL 9/13 AND LL 4/8	LE Resolving List and Periodic Advertising	HCI/CCO/BI-05-C
Device Discovery		
HCI 1a/1 AND HCI 6/3 AND HCI 6/4	Periodic Inquiry Mode	HCI/DDI/BV-01-C
HCI 1a/1 AND HCI 6/9 AND HCI 6/10	Inquiry Mode Command	HCI/DDI/BV-02-C
LL 1/1 AND HCI 1a/4 AND HCI 6/15 AND HCI 6/16	LE Set Advertising Enable Command	HCI/DDI/BV-03-C HCI/DDI/BI-06-C
LL 1/2 AND HCI 1a/4 AND HCI 6/20	LE Set Scan Enable Command	HCI/DDI/BV-04-C HCI/DDI/BI-07-C
LL 3/9 AND HCI 5/40 AND NOT SUM ICS 21/16	LE Set Extended Advertising Enable Command	HCI/DDI/BI-08-C HCI/DDI/BI-09-C HCI/DDI/BI-12-C
LL 3/10 AND HCI 5/41	LE Set Periodic Advertising Enable Command	HCI/DDI/BI-13-C
LL 1/2 AND HCI 1a/4 AND HCI 6/28	LE Set Extended Scan Enable Command	HCI/DDI/BI-11-C
(HCI 1a/1 OR HCI 1a/3) AND HCI 6/24	Read Extended Inquiry Length Command	HCI/DDI/BV-05-C
HCI 5/34	LE Set Extended Advertising Parameters Command	HCI/DDI/BI-01-C
HCI 6/16 AND LL 3/9	LE Set Advertising Parameters Command	HCI/DDI/BI-02-C
HCI 6/30 AND NOT HCI 6/37	Create periodic advertising sync without possibility to enable reports later	HCI/DDI/BI-03-C
HCI 6/30 AND NOT HCI 6/37	Reject LE Periodic Advertising Create Sync Command to a synchronized Advertising Set	HCI/DDI/BI-04-C

Item	Feature	Test Case
LL 4/7	LE Set Extended Scan Parameters With Unsupported PHY	HCI/DDI/BI-05-C
Connection Setup		
(HCI 1a/1 OR HCI 1a/3) AND HCI 7/33	Read Extended Page Timeout Command	HCI/CCO/BV-08-C
Connection State		
HCI 10/12	LE Set Data Length Command	HCI/CCO/BV-09-C
HCI 10/14	LE Read Suggested Default Data Length Command	HCI/CCO/BV-10-C
HCI 10/15	LE Write Suggested Default Data Length Command.	HCI/CCO/BV-11-C
Host Flow Control		
(HCI 1a/1 OR HCI 1a/3) AND HCI 14/2	Set Event Mask Command	HCI/HFC/BV-01-C
HCI 1a/1 AND HCI 14/3	Set Event Filter Command	HCI/HFC/BV-02-C HCI/HFC/BV-05-C HCI/HFC/BV-06-C HCI/HFC/BV-07-C HCI/HFC/BV-08-C HCI/HFC/BV-11-C
HCI 1a/1 AND HCI 14/3 AND LL 2/12	Set Event Filter Command, SCO	HCI/HFC/BV-09-C HCI/HFC/BV-12-C
HCI 1a/1 AND HCI 14/3 AND LMP 2/15	Set Event Filter Command, eSCO	HCI/HFC/BV-10-C HCI/HFC/BV-13-C
Authentication and Encryption		
HCI 1a/1 AND HCI 16/15 AND (NOT HCI 16/27)	Link Key Commands – IUT does not support SPP	HCI/AEN/BV-01-C
HCI 1a/1 AND HCI 16/15 AND HCI 16/27	Link Key Commands	HCI/AEN/BV-02-C HCI/AEN/BV-03-C HCI/AEN/BV-04-C

Item	Feature	Test Case
HCI 16/50 AND HCI 16/52	LE Read Local P-256 Public Key, LE Read Local P-256 Public Key Complete	HCI/AEN/BV-06-C
HCI 16/51 AND HCI 16/53	LE Generate DHKey, LE Generate DHKey Complete Event	HCI/AEN/BV-07-C
HCI 1a/1 AND HCI 16/44	Read Local OOB Extended Data Command	HCI/AEN/BV-05-C
HCI 16/51 AND HCI 16/53 AND SUM ICS 21/17	LE Generate DHKey, Invalid Point	HCI/AEN/BI-01-C
HCI 16/53 AND HCI 16/51a	LE Generate DHKey [v2]	HCI/AEN/BV-08-C
AMP		
HCI 1a/3 AND (HCI 5/11 OR 5/12)	Write Location Data Command/ Read Location Data Command	HCI/CCO/BV-01-C
HCI 1a/3 AND HCI 7/20	Logical Link Cancel Command	HCI/CSE/BV-01-C HCI/CSE/BV-02-C HCI/CSE/BI-03-C HCI/CSE/BI-04-C
HCI 1a/3 AND (HCI 7/21 OR HCI 7/22)	Logical Link Accept Timeout	HCI/CSE/BV-05-C
HCI 1a/3 AND HCI 14/8	Set Event Mask 2 Command	HCI/HFC/BV-03-C
LE		
LL 1/2 AND HCI 1a/4 AND HCI 14/14	LE Set Event Mask Command	HCI/HFC/BV-04-C
HCI 14/15	Read LE Host Support	HCI/CCO/BV-02-C
HCI 14/15 AND HCI 14/16 AND LMP 2/24	Write LE Host Support	HCI/CCO/BV-03-C
HCI 1a/1 AND (NOT HCI 1a/4) AND (NOT SUM ICS 21/3) AND (NOT SUM ICS 21/4) AND (NOT SUM ICS 21/5) AND (NOT SUM ICS 21/6) AND (NOT SUM ICS 21/8)	LE Not Supported	HCI/CCO/BV-05-C
HCI 1a/4 AND (NOT HCI 1a/1)	BR/EDR Not Supported	HCI/CCO/BV-07-C
LL 9/25	Read LE Public Key Validation Feature Bit	HCI/CIN/BV-09-C

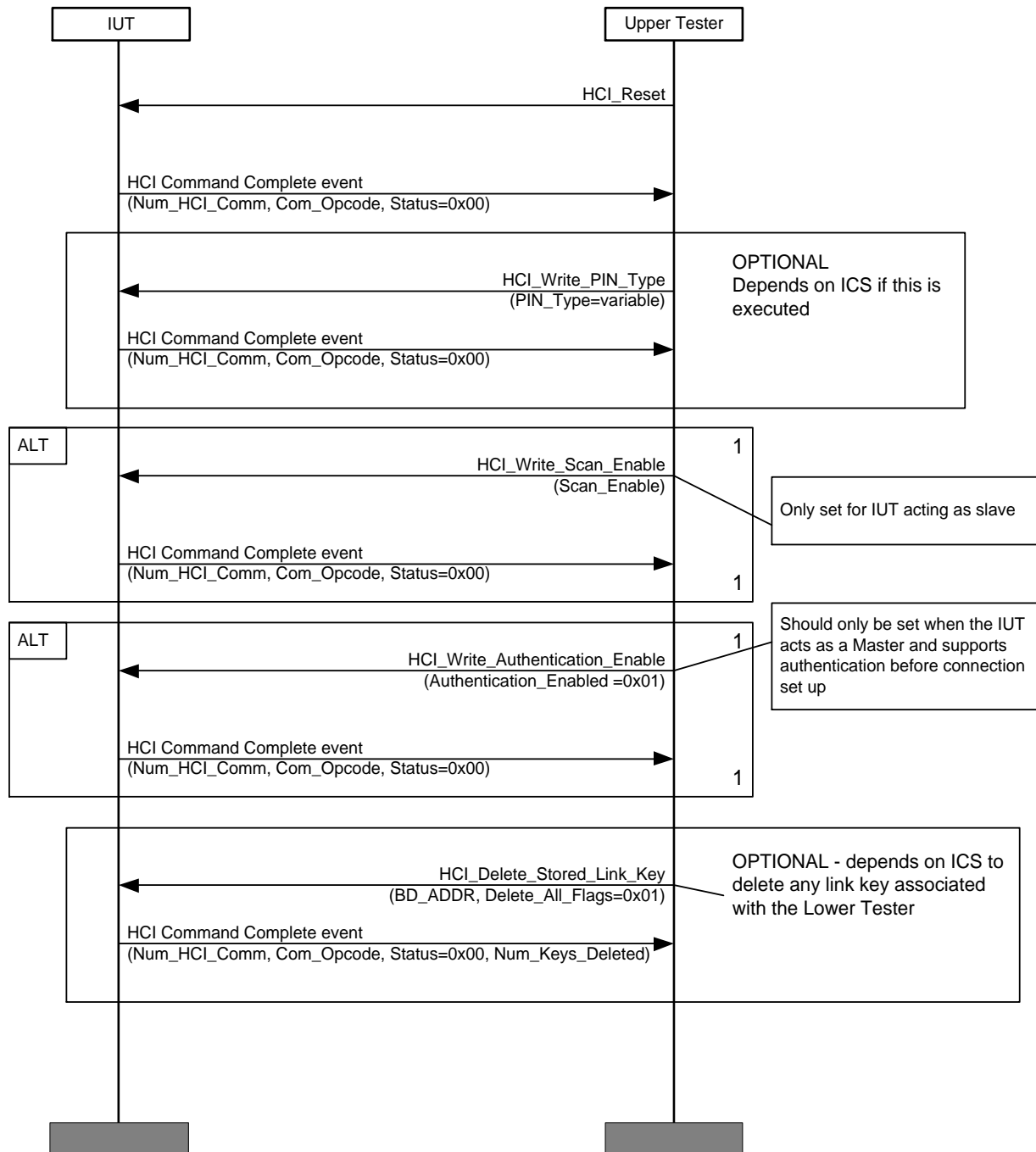
Item	Feature	Test Case
Link Layer Connection Management		
HCI 7/39 and LL 1/5	LE Read Peer Resolvable Address Command – Master	HCI/CM/BV-01-C
HCI 7/40 and LL 1/5	LE Read Local Resolvable Address Command – Master	HCI/CM/BV-02-C
HCI 13/9	LE Read PHY Command	HCI/CM/BV-03-C
HCI 7/38 AND HCI 7/41	Extended Scanning with Device Privacy, RPA Timeout During Connection Initiation	HCI/CM/BV-04-C
HCI 7/39 and LL 1/4	LE Read Peer Resolvable Address Command – Slave	HCI/CM/BV-05-C
HCI 7/40 and LL 1/4	LE Read Local Resolvable Address Command – Slave	HCI/CM/BV-06-C
LL 5/4 AND LL 5/1	LE Extended Create Connection With Unsupported PHY	HCI/CM/BI-01-C
Connectionless Broadcast		
HCI 18/5 AND HCI 18/8 AND HCI 18/9 AND HCI 18/7 AND HCI 18/1 AND HCI 18/3 AND HCI 18/10	Connectionless Slave Broadcast Transmission	HCI/CSB/BV-01-C
HCI 18/6	Delete Reserved LT_ADDR	HCI/CSB/BV-02-C
HCI 18/14	Connectionless Slave Broadcast Channel Map Change	HCI/CSB/BV-03-C
HCI 18/4 AND HCI 18/11 AND HCI 18/2 AND HCI 18/12	Connectionless Slave Broadcast Reception	HCI/CSB/BV-04-C
HCI 18/13	Connectionless Slave Broadcast Timeout	HCI/CSB/BV-05-C
HCI 7/29 AND 7/31	Truncated Page, Truncated Page Complete	HCI/CSE/BV-06-C
HCI 7/32	Page Response Timeout	HCI/CSE/BV-07-C

6 Appendix MSC

6.1 Default Settings

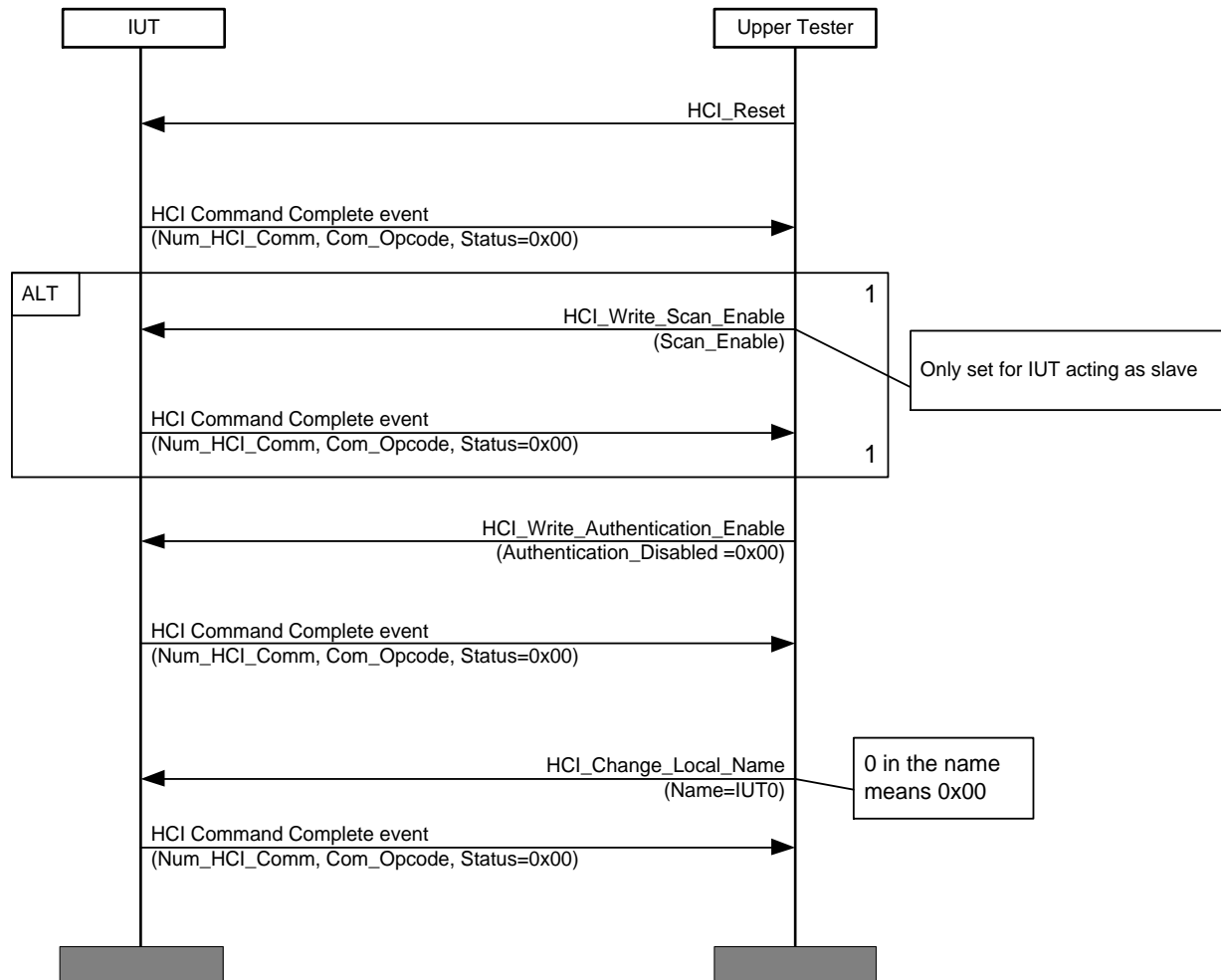
6.1.1 Authentication and Encryption

This default setting will be used for the different authentication and encryption test cases.



6.1.2 Device setup, Controller Flow Control, Controller Information, Device Discovery and Host Flow Control

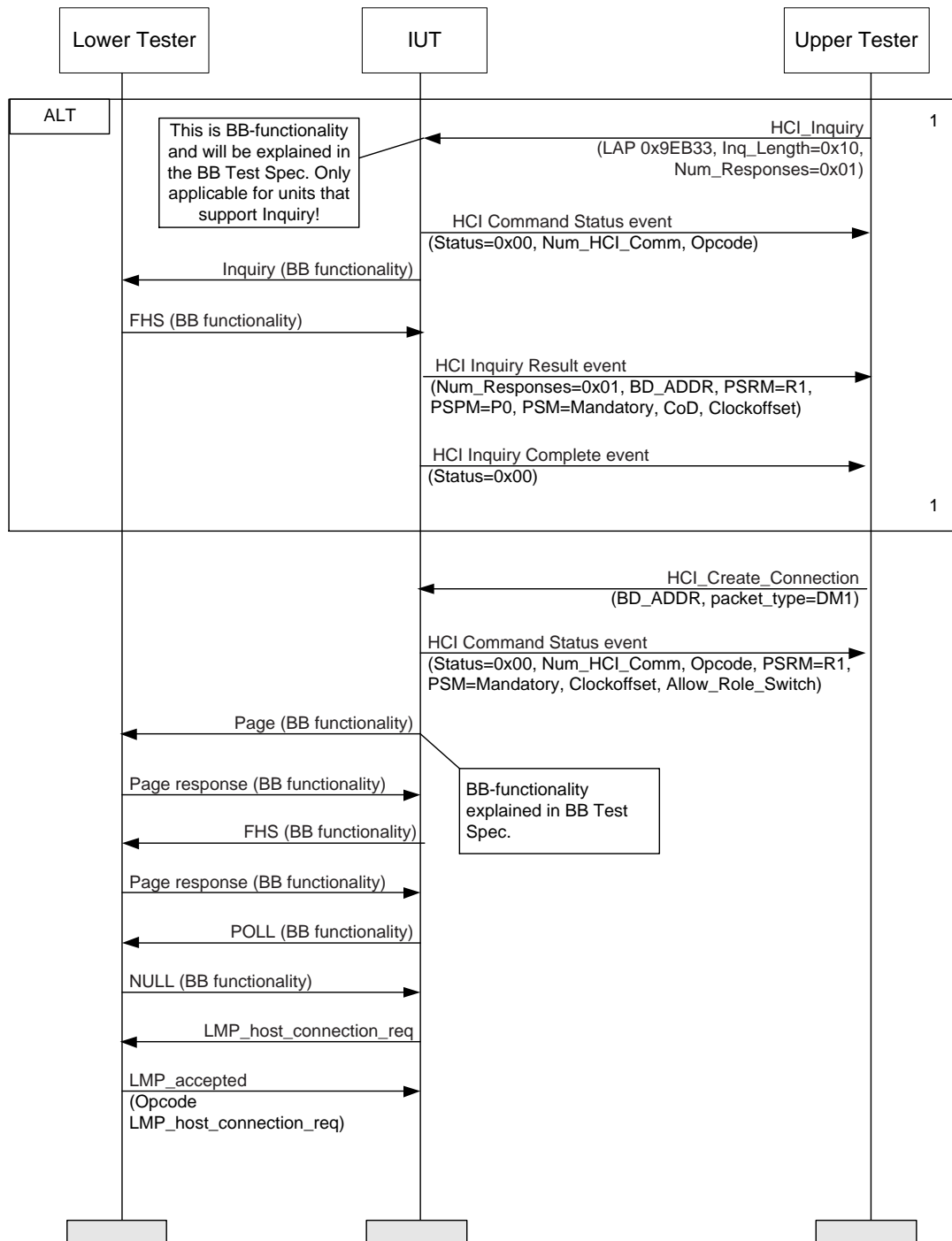
This default setting will be used for the Device setup, Controller Flow Control, Controller Information, Device Discovery, and Host Flow Control test cases.



6.2 Preambles

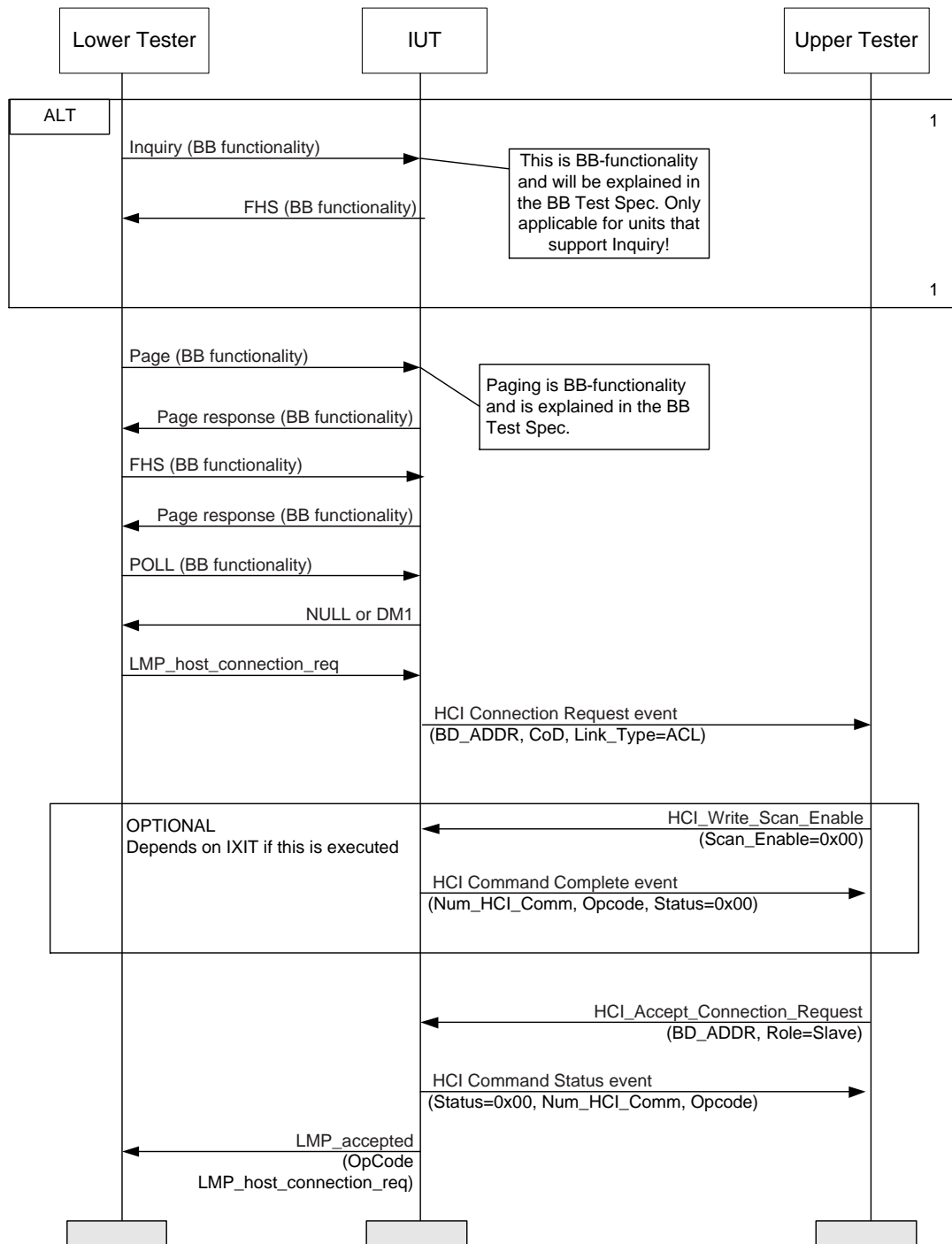
6.2.1 Connection Establishment IUT Master

This Preamble will be used when the IUT will act as Master.



6.2.2 Connection Establishment Lower Tester

This Preamble will be used in all cases when the IUT will act as a Slave.



7 Revision History and Contributors

Revision History

Revision History	Date	Comments
2.0.E.1r2	2005-11-21	<p>TSE 857 for TP/GEV/BV-01-C</p> <p>TSE 858: change to 5.7.1 and initial conditions in TP/CFC/BV-01-C, TP/DDI/BV-01-C, TP/DDI/BV-02-C, TP/HFC/BV-01-C, TP/HFC/BV-02-C</p> <p>TSE 860 for MSC 6.1.2 and 6.1.4:</p> <p>TSE 861 for TP/DSU/BV-01-C and TP/DDI/BV-01-C</p> <p>TSE 862 for Appendix MCS</p> <p>TSE 863 for TCMT row 1.</p> <p>TSE 866 for 4.1, 4.3.2.1, 4.3.2.2</p> <p>TSE 867 for TCMT a) fonts, b) TP/CIN/BV-03-C ,c) LMP:TP/AUT/BV-04-C</p> <p>TSE 868 for TP/GEV/BV-01-C</p> <p>TSE 871: Add HCI 10/10 and HCI 10/11 to TCMT</p> <p>TSE 872: TCMT selection expressions for TP/DDI/BV-01-C, TP/DDI/BV-02-C, TP/AEN/BV-01-C</p>
2.0.E.1	2005-12-07	Prepare for Publication.
2.0.E.2r0	2006-04-04	<p>TSE 881: TP/HFC/BV-01-C, TP/HFC/BV-02-C: update MFCs</p> <p>TSE 882: TP/AEN/BV-01-C; fix MSC, change pass/Fail Verdicts</p> <p>TSE 883: 6.1.1: change PIXIT to PICS</p> <p>TSE 884: Editorial updates except for searchable figure text</p>
2.0.E.2	2006-06-19	Prepare for Publication.
2.0.E.3r0	2006-10	<p>TSE 1863: update MSC for TP/AEN/BV-01-C</p> <p>TSE 1905: TP/CFC/BV-01-C: Update Notes section</p> <p>Add TP/QOS/BV-01 –TP/QOS/BV-05 and TP/QOS/BI-01-C and updates to TCMT for Persistent Sniff</p> <p>Add TP/AEN/BV-02-C and TP/AEN/BV-03-C and updates to TCMT for EPR</p> <p>Add TCMT row for TP/PROT/ARQ/BV-37-C for Packet Boundary Flag</p>
2.1.E.0r0 through 2.1.E.0r2	2006-12-05 through 2006-12-28	<p>Input reviewers' comments</p> <p>Renamed document from 2.0.E.3 to 2.1.E.1</p> <p>Removed Sections 5.2.2, 5.3.1.1, 5.4.1.1, 5.5.1.1, 5.6.1.1, 5.7.1.1, 5.8.1.1, 5.9.1.1</p> <p>Updated Note 1 with new selection expressions</p>

Revision History	Date	Comments
		<p>Add TCMT rows in Device Discovery and Authentication and Encryption sections for Simple Pairing</p> <p>Adjustments to TCMT due to ICS corrections</p> <p>Correction to document number from 2.1.E.1 to 2.1.E.0</p> <p>Input reviewer's comments</p> <p>TP/AEN/BV-02-C: remove "Applicable for all HCI devices;" assign unique name</p> <p>TP/AEN/BV-03-C: assign unique name</p> <p>Remove TP/QOS/BV-01 –TP/QOS/BV-05 and TP/QOS/BI-01-C and updates to TCMT for Persistent Sniff</p>
2.1.E.0	2006-12-28	Prepare for Publication.
2.1.E.1	2007-09-06	<p>TSE 2108: Update TCMT for TP/GEV/BV-01-C</p> <p>TSE 2218: Change TCMT for TP/AEN/BV-02-C, TP/AEN/BV-03-C; add new test TP/AEN/BV-04-C</p> <p>TSE 2124: Remove opcode values from opcode parameter in all MSCs</p>
2.1.E.2	2008-04-29	<p>TSE 2302: TP/GEV/BV-01-C: Change Pass verdict</p> <p>TSE 2404: TP/HFC/BV-02-C: update text</p> <p>TSE 2405: TP/AEN/BV-01-C : update MSC</p> <p>TSE 2450: TP/GEV/BV-01-C: TCMT change</p> <p>TSE 2451: TP/AUT/BV-03-C, TP/ENC/BV-05-C, TP/ENC/BV-07-C,TP/ENC/BV-10-C,TP/INF/BV-16-C, TP/LIH/BV-01-C,TP/LIH/BV-09-C,TP/LIH/BV-10-C, TP/LIH/BV-11-C,TP/LIH/BV-15-C,TP/LIH/BV-17-C, TP/LIH/BV-19-C,TP/LIH/BV-23-C,TP/LIH/BV-27-C, TP/LIH/BV-32-C,TP/LIH/BV-43-C,TP/LIH/BV-46-C, TP/LIH/BV-53-C,TP/LIH/BV-54-C,TP/LIH/BV-61-C, TP/LIH/BV-64-C,TP/LIH/BV-74-C,TP/AFH/BV-04-C, TP/PHYS/FRE/BV-03-C,TP/SP/BV-06-C,TP/SP/BV-08-C, TP/SP/BV-12-C,TP/SP/BV-14-C,TP/SP/BV-18-C, TP/SP/BV-20-C,TP/SP/BV-22-C,TP/SP/BV-24-C, TP/SP/BV-28-C,TP/PROT/ED/BV-01-C, TP/PROT/ED/BV-02-C,TP/PROT/ED/BV-03-C,TP/PROT/ED/BV-04-C</p>
2.1.E.3r0	2008-10-09 through 2008-11-11	TSE 2461: new test case. TCMT for LMP:TP/LIH/BV-04-C

Revision History	Date	Comments
2.1.E.3	2008-12-03	Prepare for Publication.
2.1.E.4r0	2009-02-17	Add AMP HCI test cases
3.0.H.0	2009-04-07	Prepare for Publication.
3.0.H.1	2009-08-11	TSE 2680: update mappings to match updates to PICS TSE 2953: Add section headings for new test cases TSE 2954: TP/CSE/BV-02-C: edit Initial Condition TSE 2955: TP/CSE/BI-04-C: edit test purpose TSE 2992: TP/DDI/BV-01-C edit MSC; prepare for publications
3.0.H2 through 4.0.0	2009-11-15	Transfer of material in LE_HCI_TS_0_9d7 to create a common HCI test spec with LE included Previous test cases reset test cases TP/CSC/BV-01-C .../BV-05-C renamed to TP/DSU/BV-02-C .../BV-06-C TP/CSC/BV-06-C renamed to TP/CFC/BV-03-C TP/CSC/BV-12-C renamed to TP/CIN/BV-05-C TP/CSC/BV-07-C renamed to TP/CIN/BV-06-C TP/CSC/BV-08-C & BV-09-C renamed to TP/CCO/BV-02-C & /BV-03-C TP/CSC/BV-11-C renamed to TP/HFC/BV-04-C TP/CSC/BV-13-C renamed to TP/CIN/BV-07-C TP/DDI/BV-01-C & BV-02 renamed to TP/DDI/BV-03 & /BV-04 TP/CCO/BV-02-C & TP/CCO/BV-03-C removed due to errata 3316 Correction: Additional TCs from the 6/10 3.0.H2r0 (TP/CCF/BV-01-C to BV-06-C added (TCs due to LMP enhancements) now as TP/CCO/BV-02-C to BV-07-C Remove TP/CFC/BV-02-C from TCMT. This test case does not show up in the TP&TSS section TMCT to TP/CFC/BV-03-C corrected Rename renamed TP/CFC/BV-03-C to TP/CFC/BV-02-C
4.0.1r0	2010-06-11	Revised Revision History table TSE 3469: TP/DSU/BV-05-C: Update Initial Condition, MSC, test proc, verdict.
4.0.1	2010-06-24	Corrected MSC for DSU/BV-05
4.0.2r0 through 4.0.2r6	2010-11-22 through 2011-03-22	TSE 3526: TP/GEV/BV-01-C, TP/GEV/BV-02-C: TMCT TSE 3916: TP/HFC/BV-04-C: Add 2nd reference to core spec TSE 3919: TP/DSU/BV-03-C, TP/DSU/BV-06-C update Fail verdict Made corrections to TSE 3916, 3919 per AT4Wireless review.

Revision History	Date	Comments
		<p>Made further corrections to TSE 3916, 3919 per AT4Wireless review.</p> <p>TSE 4288: TP/CCO/BV-03-C, TP/CCO/BV-04-C: Update to TCMT</p> <p>TSE 3515: TCMT: Remove ref to LMP:TP/AUT/BV-04-C</p> <p>TSE 4084: TCMT update: TP/CSE/BV-01-C, TP/CSE/BV-02-C</p> <p>TSE 4301: TP/DSU/BV-01-C: update MSC, pass/Fail Verdicts.</p> <p>TSE 4303: TP/CCO/BV-02-C, TP/CCO/BV-03-C, TP/CCO/BV-05-C, TP/CCO/BV-06-C, TP/CCO/BV-07-C: update initial conditions</p> <p>Per reviewer: TP/DSU/BV-01-C. Redrew MSC, adjusted revised text to be under correct Verdict headings.</p> <p>Per reviewer: TP/DSU/BV-01-C. MSC: changed 3 to 30, Fixed Pass/Fail verdict wording such that new text is IN ADDITION to original text, not instead of it.</p>
4.0.2	2011-07-15	Prepare for Publication.
4.0.3r0	2011-10-28	<p>TSE 3368: TP/DSU/BV-01-C: Rename test case, remapping in TCMT</p> <p>TSE 4342: TP/CCO/BV-05-C: TCMT update</p> <p>TSE 4394: TP/CCO/BV-07-C, TP/CCO/BV-06-C: update TCMT</p> <p>TSE 4410: Update TCMT for test cases with master functionality</p> <p>TSE 4501: TP/DSU/BV-01-C: update MSC</p>
4.0.3r1	2012-02-15	TSE 3369 New test case TP/DSU/BV-07-C requires an update to the TCMT
4.0.3	2012-03-30	Prepare for Publication.
4.0.4r0	2012-05-17	<p>TSE 4583: TP/HFC/BV-03-C: Change mask in MSC</p> <p>TSE 4729: TP/PROT/ED/BV-04-C: removed duplicate entry in TCMT</p> <p>Editorial: removed TC descriptions in TCMT</p>
4.0.4	2012-07-24	Prepare for Publication.
4.0.5r1	2012-10-02	<p>TSE 4881: Mapping revised for LMP test case TP/SP/BV-12-C based on released LMP TSE 4228.</p> <p>TSE 4956: Removed test cases in the TCMT that require the support optional 802.11PAL features that are not defined in the HCI core specification and therefore should not be included in the HCI testing scope.</p>
4.0.5	2012-11-15	Prepare for Publication.
4.0.6r1	2012-11-19	Connectionless Broadcast Change Request
4.0.6r2	2013-01-02	Connectionless Broadcast Review:

Revision History	Date	Comments
		<p>Deleted "Truncated Paging" from Figure 4.1.</p> <p>Edited 4.3.1.17</p> <p>Moved Verify Truncated Paging to section 5.10 and it is TP/CSE/BV-06-C, made Response Timeout Detection TP/CSB/BV-06-C.</p> <p>Changed title of 5.10 from "Controller Setup" to "Connection Setup"</p>
4.0.6r3	2013-01-03	<p>Connectionless Broadcast Review (Mayank)</p> <p>Editorial changes</p> <p>Moved "Page Response Timeout" test case to section 5.10, it is now TP/CSE/BV-07-C.</p>
4.0.6r4	2013-01-07	<p>Connectionless Broadcast Review (Alicia)</p> <p>Editorial changes to TCMT to reflect test case name changes.</p>
4.0.6r5	2013-01-24	<p>Connectionless Broadcast Review (Jason, Alicia, and Meagan)</p> <p>Updated Conformance section</p> <p>Revised feature descriptions in the TCMT for TP/CSB/BV-01-C and TP/CSB/BV-04-C.</p>
4.0.6r6	2013-01-28	Approved by BTI
4.0.6	2013-02-19	Prepare for Publication
4.0.7r1	2013-05-13	TSE 5084: TCMT Clean Up and Updates.
4.0.7r2	2013-06-11	BTI Review, Magnus, TP/SEC/SCN/BV-01-C TCMT mapping updated incorrectly, Fixed.
4.0.7r3	2013-06-13	BTI review, Alicia's comments
4.0.7r4	2013-06-16	BTI review, Saravanun's comments
4.0.7r5	2013-06-17	BTI review, fixes
4.0.7	2013-07-02	Prepare for Publication
4.0.8rT	2012-07-02	<p>Template Conversion:</p> <ul style="list-style-type: none"> - Update of language to match BTI approved wording (example, Fail Verdicts) - Removal of Test Subgroup Objectives - Removal of sections marked "N/A"
4.0.8rTr3	2013-09-23	Template Review Comment Resolution
4.1.0r01	2013-09-23	BR/EDR Secure Connections CR

Revision History	Date	Comments
4.1.0r02	2013-09-25	Train Nudging and Generalized Interlaced Scan CR
4.1.0r03	2013-09-27	TSE 5268: Clarification of TP/AEN/BV-01-C by adding a note. Updated name of TP/AEN/BV-04-C and preamble and MSC. Updates description in TCMT for TP/AEN/BV-01-C and TP/AEN/BV-04-C rows.
4.1.0r04	2013-10-09	Piconet Clock Adjust CR
4.1.0r05	2013-10-10	LE Ping CR
4.1.0r06	2013-10-17	LE Link Layer Topology CR
4.1.0r08	2013-10-26	Correction to TCMT based on review of HCI ICS
4.1.0	2013-12-03	Prepare for Publication
4.1.1r00	2013-04-07	TSE 5491: Updated Test Procedure, MSC and Pass verdict for TP/CFC/BV-02-C. TSE 5574: Updated TCMT entry for TP/HFC/BV-04-C.
4.1.1r01	2014-06-16	BTI Review by Xuguang: Updated Figure 4.11 in TP/CFC/BV-03-C to read "HCI_LE_Data_Packet" instead of "HCI_Data_Packet".
4.1.1	2014-07-07	TCRL 2014-1 Publication
4.1.2r00	2014-10-20	TSE 5918: Correction in Test Description and MSCs for TP/CCO/BV-03-C, TP/CCO/BV-04-C
4.1.2r01	2014-11-05	BTI Review, Dave, revised the test descriptions of TP/CCO/BV-03-C and TP/CCO/BV-04-C to align with the language update in TSE 5918.
4.2.0r00	2014-11-07	Integrated changes from Section 4 of Core_LE_Data_Length_Extensions_TEST.CRr01_clean
4.2.0r01	2014-11-24	Rasmus reviewed; added Privacy 1.2 commands & Minor editorial fixes
4.2.0r02	2014-11-25	Mayank reviewed. Updated naming from "Read/Write Default..." to "LE Read/Write Suggested Default..." Other editorial fixes
4.2.0	2014-12-04	Prepare for TCRL 2014-2 publication
4.2.1r00	2015-05-05	TSE 6367: Corrected TP numbering for TP/DSU/BV-04-C TSE 6152: Corrected TCMT mapping for TP/AEN/BV-06-C and TP/AEN/BV-07-C

Revision History	Date	Comments
4.2.1r01	2015-05-16	Review by Magnus; corrected TSE 6152 by adding HCI 16/53
4.2.1	2015-07-14	Prepared for TCRL 2015-1 publication
4.2.2r00	2015-10-07	TSE 6564: Corrected TCMT mapping for TP/CSB/BV-03-C. TSE 6703: Corrected mapping for TP/CM/BV-01-C and TP/CM/BV-02-C
4.2.2	2015-12-22	Prepared for TCRL 2015-2 publication
4.2.3r00	2015-01-11	TSE 6817: Corrected typo in first message of MSC for TP/HFC/BV-02-C.
4.2.3r01	2015-01-18	TSE 6850: Corrected first message of MSCs for TP/CCO/BV-10-C and TP/CCO/BV-11-C.
4.2.3r02	2016-02-04	TSE 6791: Last event from IUT: Channel Map changed from "0x00000000FFFFFFFFFFFF" to "0x00000000FFFFFFEFFFFFFE" in MSC of test case TP/CSB/BV-03-C
4.2.3r03	2016-02-15	TSE 6718: Initial condition changed to "IUT is in standby" for test cases TP/CCO/BV-12-C – ...14-C. TSE 6909: Editorial edit. TCMT Updates: Deleted "AND HCI 2/1" from Item column for test cases TP/DSU/BV-01-C – ...07-C. Moved test case TP/DSU/BV-07-C to end of Device Setup section.
4.2.3r04	2016-03-03	TSE 6756: Changed Initial Condition to "No LL connection exists" for test cases TP/CIN/BV-01-C – 04-C, TP/AEN/BV-01-C, and TP/AEN/BV-04-C. Deleted test cases TP/CIN/BV-05-C and TP/CIN/BV-07-C. TCMT Updates: Deleted mapping for TP/CIN/BV-05-C and TP/CIN/BV-07-C, as they are duplicates of 03-C and 04-C (visible with all markup showing). Consolidated mapping to HCI 4/1 and HCI 4/2. TSE 6783: Updated Test Procedure, MSC, and Pass Verdict for TP CCO/BV-05-C and CCO/BV-07-C and accept HCI Command Complete Event or HCI Command Status Event with Status = Unknown_HCI_Command. TSE 6808: Added four new Sections 4.7.5–8, test cases TP/HFC/BV-05-C – 08-C. All four new MSCs redrawn and captioned. In TCMT, added four new test cases to Host Flow Control, second item. TSE 6908: Updated test case TP/GEV/BV-01-C (entire section). Deleted test case TP/GEV/BV-02-C. TCMT: Updated Item and Feature for test case TP/GEV/BV-01-C and deleted mapping for test case TP/GEV/BV-02-C. TSE 6949: In TCMT, updated second Item under Host Flow Control for test case TP/HFC/BV-02-C.
4.2.3r05	2016-04-06	TSE 6763: Test case TP/AEN/BV-05-C updated (multiple reads are not identical). Expanded title of test case TP/AEN/BV-05-C. MSC updated and figure caption added. Pass verdict updated.

Revision History	Date	Comments
		TSE 6940: Deleted test case and TCMT mapping for TP/CCO/BV-06-C.
4.2.3	2016-07-13	Prepared for TCRL 2016-1 publication
5.0.0r00	2016-07-07	Integrated changes for Core Specification 5.0 release
5.0.0r01	2016-09-12	Issue 7626: Added new reference to the Core Specification Version 5.0 or later. Updated cross-references for test cases TP/DDI/BI-01-C & 02-C, TP/CCO/BV-15-C – 20-C, and TP/CM/BV-03-C.
5.0.0r02	2016-09-30	Issue 7728: Deleted reference to test case TP/FRH/SLA/BV-03-C in TCMT.
5.0.0r03	2016-10-07	<p>TSE 7581 (erratum 7021): Change LE Set Advertise Enable to LE Set Advertising Enable.</p> <p>TSE 7665: Clarify mapping of feature bits and ICS entries in TP/CIN/BV-01-C and 02-C.</p> <p>TSE 7574 (erratum 7017): Added optional LE_Data_Length_Change event to test TP/CCO/BV-09-C [LE Set Data Length] and replaced MSC accordingly.</p> <p>TSE 7252: Added new reference for SUM ICS. Updated Initial Condition for test cases TP/CCO/BV-03-C and TP/CCO/BV-04-C.</p>
5.0.0r04	2016-11-10	<p>Issue 8046: Updated initial condition for TP/CCO/BV-16-C through TP/CCO/BV-20-C ("LE Read Periodic Advertiser List Size Command, LE Add/Remove/Clear Periodic Advertiser List Commands, LE Read Transmit Power Command, LE Write RF Path Compensation Command, and LE Read RF Path Compensation Command): IUT initially is in standby.</p> <p>Issue 8049: Replaced figures for TP/CCO/BV-16-C [LE Read Periodic Advertiser List Size Command] (Figure 4.49) and TP/CCO/BV-17-C [LE Add/Remove/Clear Periodic Advertiser List Commands] (Figure 4.50) to fix typo in command name ("HCI_LE_Add_Device_To_Period_Advertiser_List" becomes "HCI_LE_Add_Device_To_Periodic_Advertiser_List").</p> <p>Issue 8038: Updated Generic Events description to cover mixed legacy and extended advertising commands; added new Generic Events test case, TP/GEV/BV-02-C; added the new test case to Test Case Mapping Table.</p>
5.0.0	2016-12-13	Approved by BTI. Prepared for TCRL 2016-2 publication.
5.0.1r00	2017-03-06	<p>TSE 7685: In test case HCI/CSB/BV-04-C, changed figure caption from "TP/CSB/BV-01-C" to "HCI/CSB/BV-04-C".</p> <p>TSE 7800: Updated test case HCI/HFC/BV-07-C: Changed "disable" to "disabled" in introduction. Updated Pass Verdict. Updated MSC: Deleted ALT1 procedure. Removed "ALT2" label.</p> <p>TSE 8301: Updated TCMT and mapping for LL: LL/CON/ADV/BV-05-C and LL: LL/CON/INI/BV-13-C.</p>

Revision History	Date	Comments
5.0.1r01	2017-04-10	TSE 8667: Updated test case HCI/DDI/BI-01-C: Corrected spelling error "AFdvertising" to "Advertising". Updated pass verdict. Updated MSC (Figure 4.21: HCI/DDI/BI-01-C) to include changes that were made to the pass verdict.
5.0.1r02	2017-04-27	TSE 8915: Clarifications made to HCI/DDI/BI-01-C from TSE 8667 by correcting typos ("internal" to "interval" in initial condition, test procedure, and MSC), changed "Adv" to "Advertising" in pass verdict and updated value in MSC ("0x03" to "0x30"). Updated pass verdict and corrected typos ("internal" to "interval") in test procedure for HCI/DDI/BI-02-C. TSE 8821: Updated mapping in TCMT for LL: LL/DDI/SCN/BV-13-C.
5.0.1r03	2017-05-16	TSE 7858: Updated MSC in HCI/CM/BV-02-C: Changed last message parameter from "Peer_Resolvable_Address" to Local_Resolvable_Address".
5.0.1r04	2017-05-10	Converted to new Test Case ID conventions as defined in TSTO v4.1.
5.0.1	2017-07-05	Approved by BTI. Prepared for TCRL 2017-1 publication.
5.0.2r00	2017-08-17	TSE 9164: For HCI/HFC/BV-04-C in Figure 4.25, changed "Even_Mask=0x20008000000018890" to "Event_Mask={bits 4, 7, 11, 15, 16, 43, 61}" and changed "Event_Mask=0x000000000000001D" to "Event_Mask={bits 0, 2, 3, 4}." TSE 9380: For HCI/AEN/BV-01-C Link Key Commands figure, removed Com_Opcode values. For HCI/AEN/BV-06-C Public Keys figure, removed Comm and Opcode values and TBD; changed "P256" to "P-256". For HCI/AEN/BV-07-C Generate D H Keys figure, removed Comm values and "Opcode=TBD"; changed "P256" to "P-256". For HCI/CSE/BV-01-C Logical Link Cancel Command and HCI/CSE/BV-02-C Logical Link Cancel Command figures, removed Comm and Opcode values.
5.0.2r01	2017-08-23	TSE 9681: For HCI/AEN/BV-05-C, revised Initial Condition text and Figure 4.34.
5.0.2r02	2017-09-14	TSE 9775: Revised text and replaced figure in test case HCI/GEV/BV-02-C and revise TCMT. Added new test case HCI/GEV/BV-03-C and added it to the TCMT.
5.0.2r03	2017-09-19	AoA/AoD: Integrated new test cases from the AoA/AoD CR into the TCMT.
5.0.2r04	2017-09-29	TSE 9830: Changed the feature name from "LE Read Remote Used Features" to "LE Read Remote Features" for LL/CON/SLA/BV-11-C, LL/CON/SLA/BI-06-C, and LL/CON/SLA/BV-23-C in the TCMT.

Revision History	Date	Comments
5.0.2r05	2017-10-12	TSE 9747: Remapped the TCMT for LL test cases for LE Data Length Change Event features according to LL TSE 9729.
5.0.2r06	2017-10-13	TSE 9931: Added new test case HCI/GEV/BV-04-C to the "Generic Events" section and TCMT.
5.0.2r07	2017-10-16	TSE 9900: Updated the Event_Mask values in MSCs HCI/HFC/BV-01-C, HCI/HFC/BV-03-C, and HCI/HFC/BV-04-C. Added a second pass verdict to Expected Outcome for HCI/HFC/BV-03-C.
5.0.2	2017-12-07	Approved by BTI. Prepared for TCRL 2017-2 publication.
5.0.3r00-05	2018-02-21 – 2018-06-15	<p>TSE 10227 (rating 1): Editorial fix to MSC for HCI/CM/BV-01-C & 02-C: Replaced "Own_Address_Type=0x00" in the 'IUT is Slave' alternative with "Own_Address_Type=0x02"</p> <p>TSE 10282 (rating 3): Added note to HCI/CCO/BV-04-C MSC about LMP features ext req being "optional if..." in the event that local features have not changed.</p> <p>TSE 10467 (rating 2): Revised Section 5.1 (Test Case Mapping). Revised TCMT: deleted "Test Case Applicable" column; changed LMP/ENC/BV-45-C to 48-C; revised items for LMP/ENC/BV-27-C, 31-C, 25-C, 48-C, LMP/AUT/BV-03-C, 04-C, 06-C, LMP/SP/BV-64-C, 65-C.</p> <p>TSE 10494 (rating 3): Added "Command Status" to the Test Purpose, Test Procedure steps 3 and 6, MSC, and Pass Verdict for test case HCI/GEV/BV-03-C. Added new column "Associated Event" to Test Procedure tables in steps 3 and 6.</p> <p>TSE 10494 (rating 3): Revised LE Periodic Advertising Create Sync Cancel command's associated event from HCI_Command_Status_Event to HCI_Command_Complete_Event in Table 4.4 of the test procedure for test case HCI/GEV/BV-03-C.</p> <p>Incorporated Core E10734 Pairing Updates TS CR: Added new test cases HCI/CIN/BV-08, 09-C, and HCI/AEN/BI-01-C and added them to the TCMT.</p>
5.0.3	2018-07-02	Approved by BTI. Prepared for TCRL 2018-1 publication.
5.0.4r00-r10	2018-07-19 – 2018-11-13	<p>Incorporated Core_PAST_CLE_TEST_CR_r05: Added 2 rows to Table 4.2. Added new test case HCI/DDI/BI-03-C. Added to TCMT: HCI/DDI/BI-03-C, LL/CON/SLA/BV-103-C, and LL/CON/MAS/BV-99-C.</p> <p>Incorporated Core Minor Enhancements Batch 1 Test CRr10-clean: Added 1 new test case to spec text and TCMT: HCI/AEN/BV-08-C. Added 5 new tests cases to TCMT: LL/DDI/ADV/BI-03-C – 04-C; LL/DDI/ADV/BV-40-C – 42-C.</p> <p>Issue 10716: Added 6 new test cases to spec text and TCMT: HCI/CCO/BV-21-C – 26-C.</p> <p>Issue 10826: Added 2 new test cases to TCMT: LL/DDI/ADV/BI-05-C – 06-C.</p>

Revision History	Date	Comments
		<p>Issue 11122: Deleted LE Random Address test cases from MEP 17: HCI/CCO/BV-21-C – 26C and removed mapping. Removed mapping for deleted LL test cases DDI/ADV/BI-03-C, BI-04-C, BV-40-C through 42-C.</p> <p>TSE 10621 (rating 3): Updated test purpose, test procedure, and pass verdict for test case HCI/GEV/BV-04-C.</p> <p>TSE 10717 (rating 2): Updated MSC for test case HCI/CCO/BV-05-C. In TCMT, updated mapping for test cases HCI/CCO/BV-05-C and 07-C.</p> <p>TSE 10718 (rating 3): Updated MSC for test case HCI/DSU/BV-01-C.</p> <p>TSE 10723 (rating 2): In TCMT, deleted duplicate test case LL/DDI/SCN/BV-15-C, and updated mapping for test cases LL/DDI/SCN/BV-13-C to 17-C.</p> <p>TSE 10724 (rating 1): In TCMT, deleted duplicate test case LL/SEC/ADV/BV-02-C, and updated mapping for test cases LL/SEC/ADV/BV-02-C and 03-C.</p> <p>TSE 10840 (rating 4): Updated test purpose, initial condition, test procedure, MSCs, and pass verdict for test case HCI/HFC/BV-08-C.</p> <p>TSE 11002 (rating 1): Updated MSC caption for test case HCI/CIN/BV-08-C.</p> <p>TSE 11003 (rating 1): Updated MSC caption for test case HCI/CIN/BV-09-C.</p> <p>TSE 10838 (rating 4): Updated initial condition, MSC, and pass verdict for test case HCI/CCO/BV-10-C. Updated test procedure, MSC, and pass verdict for test case HCI/CCO/BV-11-C.</p> <p>TSE 10576 (rating 3): Deleted top MSC for test case HCI/HFC/BV-04-C.</p> <p>TSE 10722 (rating 1): In TCMT, deleted test case LL: LL/CON/SLA/BI-06-C and changed LL: LL/CON/SLA/BV-11-C to LL: LL/CON/SLA/BV-22-C.</p> <p>TSE 11157 (rating 4): Added new reference to Erratum 10831. Added new test case HCI/CM/BV-04-C and added it to the TCMT.</p> <p>TSE 10842 rejected by BTI. Removed changes made by TSE 10842.</p> <p>TSE 11002 (rating 1): Minor Modification: changed Figure 4.18 title from “HCI/CIN/BV-07-C” to “HCI/CIN/BV-08-C”.</p> <p>Replaced [X] values with actual values.</p> <p>Changed Madrid grey text to black text.</p>
5.1.0r00-r01	2018-11-13 – 2018-11-29	<p>Updated revision number from 5.0.4 to 5.1.0 to align with the adoption of Core Specification version 5.1</p> <p>TSE 11269 LMP/ENC/BV-27-C, ../BV-31-C and ../BV-25-C removed from TCMT</p>

Revision History	Date	Comments
5.1.0	2018-12-07	Approved by BTI. Prepared for TCRL 2018-2 publication.
5.1.1r00–r13	2019-03-29– 2019-06-21	<p>TSE 11646 (rating 1): Updated TCMT Item to HCI 7/38 and HCI 7/41 for test case HCI/CM/BV-04-C.</p> <p>TSE 11489 (rating 3): Updated Pass Verdict for test cases HCI/CCO/BV-02-C and -03-C.</p> <p>TSE 11436 (rating 3): Replaced MSC for test case HCI/DSU/BV-01-C with new one.</p> <p>TSE 11488 (rating 4): Deleted test case HCI/CCO/BV-04-C and updated TCMT accordingly.</p> <p>TSE 11475 (rating 3): Updated pass verdict for test case HCI/DDI/BV-04-C.</p> <p>TSE 11200 (rating 1): Added a Notation Conventions section to describe editorial conventions.</p> <p>TSE 11197 (rating 4): Updated text and MSCs in test cases HCI/CM/BV-01-C and -02-C. Added test cases HCI/CM/BV-05-C and -06-C and updated TCMT accordingly.</p> <p>TSE 10726 (rating 2): Updated TCMT to address mapping issues.</p> <p>TSE 11171 (rating 4): Added new section for “Resolving List Commands fail when list in use” and related test cases HCI/CCO/BI-01-C – -05-C.</p> <p>TSE 11168 (rating 4): Added new test case HCI/DDI/BI-04-C (and updated TCMT accordingly). Updated MSC, Pass Verdict, and Test Procedure steps 2 and 5 and added steps 7-10 for test case HCI/CCO/BV-17-C.</p> <p>TSE 11163 (rating 4): Added test cases HCI/DDI/BI-05-C and HCI/CM/BI-01-C and updated TCMT accordingly.</p> <p>TSE 11209 (rating 4): Updated test case name for test case HCI/HFC/BV-05-C; added new test cases HCI/HFC/BV-09-C – -13-C. Updated TCMT accordingly.</p> <p>TSE 11869 (rating 1): Updated TCMT to address a mapping issue with test case HCI/AEN/BI-01-C.</p> <p>TSE 11194 (rating 4): Added new section “Reject Invalid Enable Command” with test cases HCI/DDI/BI-06-C – -11-C and new test cases HCI/DDI/BI-12-C [Reject Invalid Extended Advertising Enable Command] and HCI/DDI/BI-13-C [Reject Invalid Periodic Advertising Enable Command] and updated TCMT accordingly.</p> <p>TSE 11952 (rating 1): Fixed a typo in step 5 of test case HCI/CM/BV-04-C.</p> <p>TSE 11900 (rating 2): Updated step 3 of test case HCI/GEV/BV-02-C and added a “Command Complete Event” column to the step 3 table.</p> <p>Updated to incorporate BTI review feedback, adding test cases HCI/CCO/BV-10-C and HCI/CCO/BV-11-C back into the TCMT and updating template.</p>

Revision History	Date	Comments
5.1.1	2019-08-01	Approved by BTI. Prepared for TCRL 2019-1 publication.

Contributors

Name	Company
Elisa Rincón	AT4 Wireless
Juan Manuel Hidalgo	AT4 Wireless
Alicia Courtney	Broadcom Corporation
Magnus Sommansson	CSR
Mayank Batra	CSR
Peter Flittner	CSR
Robin Heydon	CSR
Simon Morris	CSR
Robert Kyacek	EM Microelectronics
Frank Karlsen	Nordic Semiconductor
Rasmus Abildgren	Samsung Electronics Co., Ltd.
Martti Soderlund	TietoEnator